

# The AUTOMOBILE

## Sunbeam Wins Isle of Man Race

K. Lee Guinness Averages 56.44 Miles per Hour in 600-Mile,  
2-Day Grind—Minervas Second, Third and Fifth  
—French D. F. P. Gets Sixth Place

**D**OUGLAS, ISLE OF MAN, June 11—*Special Cablegram*—The fifth international race for the Tourist Trophy, the classic of English road-racing, was won today on the 37.5-mile course on this island by K. Lee Guinness, driving a Sunbeam. Guinness averaged 56.44 miles per hour for the 600-mile race which was run in two divisions, 300 miles yesterday and 300 miles today.

Second honors were carried off by the Minerva company of Belgium, which had three sleeve-valve, Knight-type motors, and finished all three of them, taking second, third and fifth positions, and thereby winning the team-prize offered for the best average of a team of three cars in the race.

The Minerva finishing second averaged 54.74 miles per hour, the one finishing third averaged 52.6 miles per hour, and the one finishing fifth averaged 51.37 miles per hour. The Minerva was the only team of three cars entered in the race to finish all three, a fact which is taken here as a great indication of what the sleeve-valve motor can do in a racing car.

With the Belgian Minervas taking three of the six positions, England had to be con-



K. Lee Guinness on the Winning Sunbeam

tent with first and fourth places, a Straker-Squire carrying off fourth honors at 51.37 miles per hour.

France had but one car entered in the race, a D. F. P., which finished in sixth position, averaging 48.38 miles per hour.

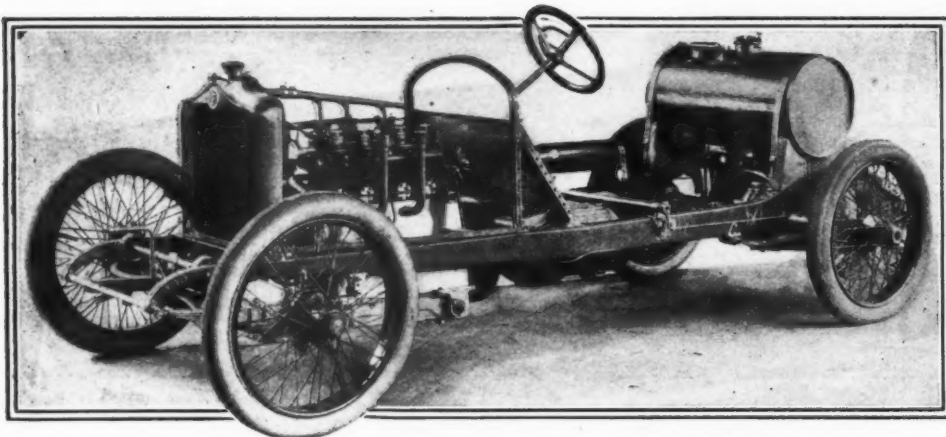
### Sunbeam Never Headed

Guinness put his Sunbeam to the front in the first lap and was never headed. During the first day's race, which was 8 laps of the circuit, he averaged 57.2 miles per hour, and his fastest lap for the day was at a pace of 59.3 miles per hour, an excellent speed considering the severe hills of the course, and the further fact that the race was limited to motors with 3,310 cubic centimeter piston displacement, which is equivalent to 202 cubic inches, which is very small.

The following prizes were given: To the winner, the *Daily Telegraph* Tourist Trophy and \$5,000; to second man, \$1,250, presented by the proprietors of the *Daily Telegraph*; a team prize of \$1,500 given by the *Daily Telegraph*, and a fuel prize for the best performance on a fuel other than gasoline alone of \$500, also presented by the *Telegraph*.

### How the Cars Finished

Position	Car	Driver	Speed
1	Sunbeam	K. Lee Guinness.....	56.44
2	Minerva	C. Reicken.....	54.74
3	Minerva	W. G. Tuck.....	52.60
4	Straker-Squire	R. S. Witchell.....	51.37
5	Minerva	J. Porporato.....	51.37
6	D. F. P.	W. O. Bentley.....	48.38



Chassis of one of the Minerva cars in the Tourist Trophy Race

In addition the winning Sunbeam was awarded the Edmunds Challenge Trophy, which is given to the contestant that makes the best aggregate time in ascending the hill from Ramsey to the Bungalow and which actually finishes the race.

The Minerva coming in second also received the second prize in this contest, while the Straker-Squire was third. The average time of the winner up this hill was 55 miles per hour.

Somewhat of a cloud rested on this victory of the Minerva due to a protest being lodged because of the excessive smoke from the exhaust of these cars which are special racing motors, and have an additional exhaust port at the bottom of the cylinder, or at a point just above the piston when at the bottom of the stroke. The judges held that the cars had the right to compete and consequently the smoke protest was overruled.

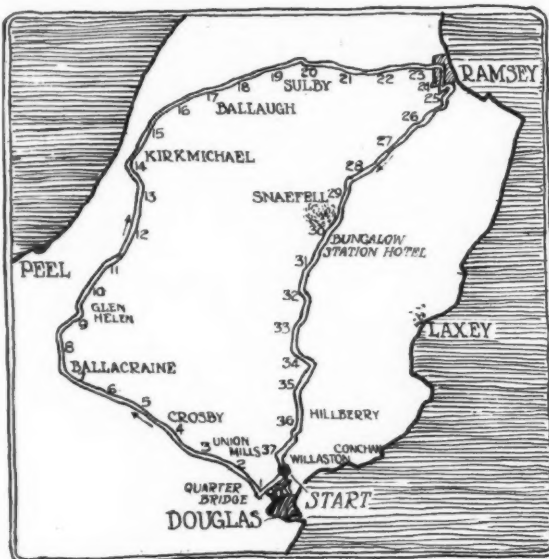
Due to the stringent rules governing the use of automobiles on the British highways, it is impossible to conduct a road race in the country excepting on the Isle of Man, which was the scene of today's fifth race. The course is a typical road circuit 37.5 miles in extent and under the regulations the contestants had to cover this 8 times each day, making a total of 300 miles per day, or 600 miles for the complete race.

Twenty-two cars started the race on the first day and of these only 6 finished, the others having been eliminated because of mechanical troubles, with the exception of 2 which upset.

#### Twenty-three Entries Made

Twenty-three entries were made, but one of these, a four-cylinder Hudson, entered by the London dealer, did not start owing to a broken flywheel. Of the 22 starters, 14 represented Great Britain, Belgium was represented by 4, the 3 Minervas and 1 S. A. V. A., France had 1, the D. F. P. and Germany had the 3 Adlers.

The winning Sunbeam, the same as all of the motors in the race, was a four-cylinder design. It has a block casting with cylinders 81 x 160, practically 2 to 1 stroke-bore ratio. The valves are in the cylinder heads, there being two intakes and two exhausts for each cylinder.



Map of the course in the Isle of Man over which the Tourist Trophy Race was run

The majority of the cars used special racing motors, limited in piston displacement to 202 cubic inches, and further restricted by a minimum weight clause of 2408 pounds. The chassis were required to have a minimum tread of 54 inches and a wheelbase of not less than 108 inches. Under the regulations all cars had to be fitted with mufflers or effective silencers that met with the approval of the judges. The use of any kind of fuel was permitted and a special prize offered for fuels other than standard gasoline.

Several of the cars on which most confidence had been staked were early to fall out of today's race, this particularly applying to the Vauxhalls, two of which went out in the first lap, and the third one upset in the sixth lap. All of these cars carried motors especially designed for the race, having overhead valves, four to each cylinder, together with particularly light steel pistons and balance weights on the crankshaft.

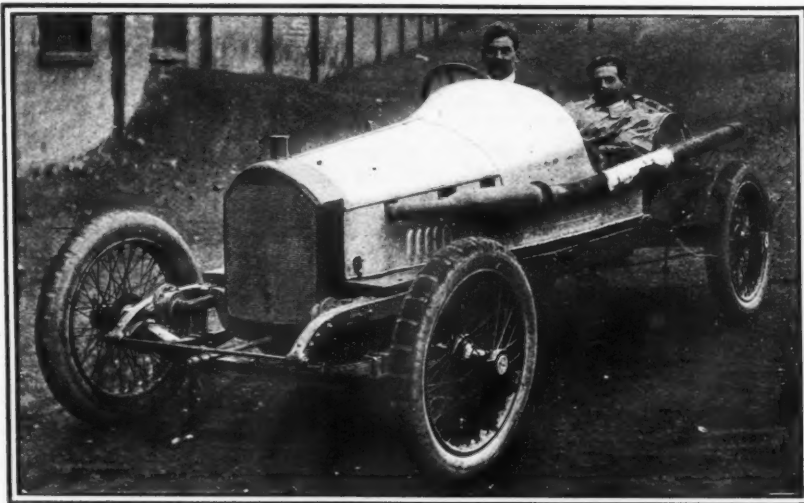
#### Many Good Cars Drop Out

Tire troubles were practically nil in today's race due naturally to the relatively slow speed as compared with Indianapolis and other high-speed races. Dunlop tires were used on all except the German Adlers.

The Minerva cars used every effort to win both yesterday and today, and their drivers took greater chances on the road than any of the others, driving the corners at high speeds throughout the entire contest.

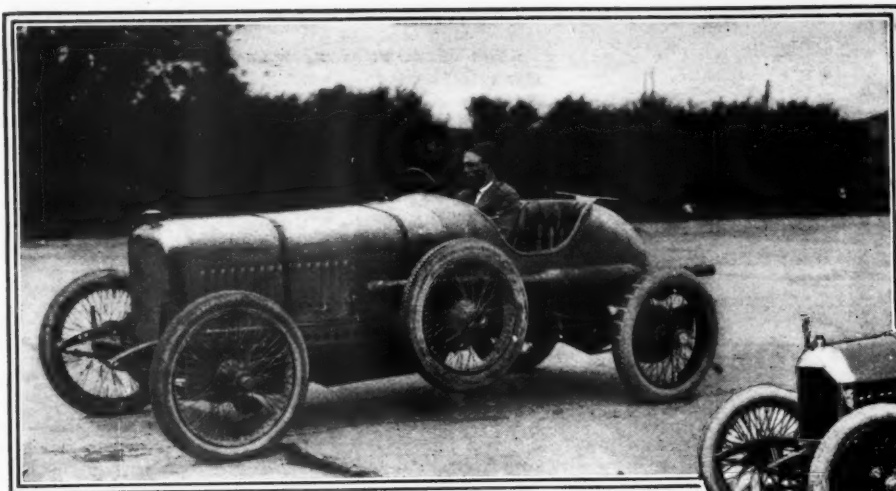
#### Sunbeam Has New Motor

The feature of the winning Sunbeam, as well as the others in the race, is the special motor with valves in the head. This is a new departure for the Sunbeam company, as heretofore its racing cars have been adapted from tour-

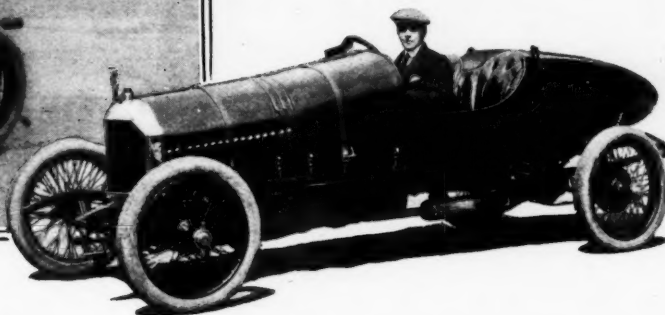


Star car which took part in the Tourist Trophy Race on the Isle of Man





Left—Straker-Squire car driven by R. S. Witchell in the Tourist Trophy Race held on the Isle of Man



Right—D. F. P. car driven by W. O. Bentley in the Tourist Trophy Race on the Isle of Man

ing car designs, incorporating the L-head type of motor.

The motor is extremely neat and looks small and light compared with other designs. This is doubtless because there are two separate cases for the camshafts, and these are only large enough to contain them. By using two camshafts rocker arms are eliminated, making the tappets very short. Instead of a roller a very light rocking finger is interposed between the cam and the tappet foot to relieve the side thrust. By the use of four valves per cylinder each valve and spring is very light, it being possible to compress the springs with the fingers. The drive for the camshafts is by a train of spur gears.

Another innovation, as far as the Sunbeams are concerned, is the use of a ball-bearing crankshaft. It is understood that this was adopted because the small width enables the motor to be built very short and in this way weight is saved. Three bearings are used and in order to mount the center bearing the crankshaft is made in two parts. Balanced masses are used and great care has been taken to keep the masses light. Steel is still used for a piston material.

#### Compressed Air Used in Lubricating

Lubrication is by air pressure from the dash tank and there is a pump in the sump which exhausts it, returning the oil to the tank. To lubricate these there are rings of thin steel attached to the crank webs and oil is blown into them, thence centrifugal force carries it to the crankpin drillings and so to the big ends.

The clutch is a Ferodo-faced cone. There is a clutch brake

of large size and then comes the four-speed, gearbox and behind it the expanding brake. No hand-adjusting nut is provided because the surface is sufficient for several hundred miles.

The axle construction is normal. The propeller shaft is exposed and has two universal joints. The back springs are underslung half-elliptical, and both back and front are fitted with Houdaille shock absorbers.

#### Minervas Have Auxiliary Ports

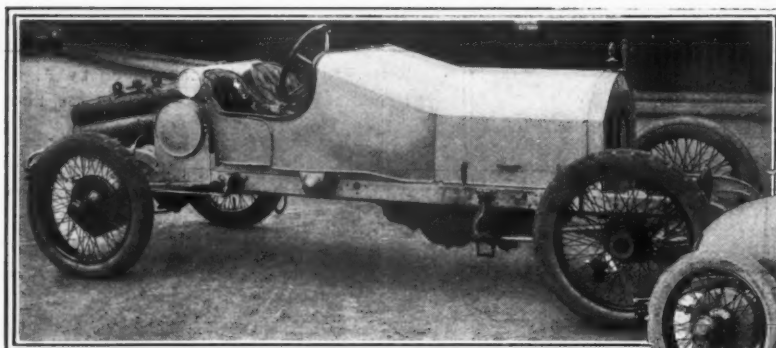
The Minerva motors, which made such an excellent showing, use the Knight sleeve principle, but with a peculiarity in the exhaust port setting. At the conclusion of the firing stroke a number of supplementary slits of large size are opened.

The inlet ports are in the head of the sleeves, as usual, and here also are the ordinary exhaust ports, but the chief portion of the gas passes out of the auxiliary port.

Next, instead of using a single, second motion shaft with eight crank throws, each operating one sleeve, there are two such shafts, one on each side of the cylinders and one shaft operates the four outer sleeves only and the other the inner ones. This gives each sleeve operating connecting-rod a double amount of bearing surface, or to be more accurate, each sleeve has two connecting rods, but both on the same side. The outer sleeve is pierced with a number of large



The three Humber cars which took part in the Tourist Trophy Race on the Isle of Man



Left—Rawlinson's Hudson which was entered in the Isle of Man race did not start  
Right—S. A. V. A. car driven by René Burger in the Isle of Man race



holes for lightness, but there is very little oil grooving in either sleeve. Gears are used to drive the side shafts.

#### Lubrication System Is Complete

The lubrication system is interesting in that it combines everything. There is first of all a large tank on the dashboard and thence oil is admitted to the crankcase by a huge float-feed valve. From the sump it is picked up by a pump and forced to the crankshaft journals and supplied to the troughs for the purpose of making a sleeve lubricating spray. Behind the radiator is a set of plain copper tubes with a chamber above and below, a single-row radiator, in fact, and a second pump takes the oil out of the sump through the radiator back to the dashboard tank.

The gearset is a four-speed type with the power transmitted from the motor by means of a leather cone clutch. An open type of driveshaft carries the torque to a plain bevel, the Citroen double-helical bevel, which is the usual final drive on Minervas having been discarded. The gear ratio on high is 3.46 to 1, which, it is stated, allows the entire circuit to be made on high gear. The maximum speed of the motor is 3,300 per minute.

The rear springs are underslung and very long, and, there-

fore, no torque rod is used, and as the springs are normally quite flat side sway is minimized. No attempt has been made to streamline the bodies.

The Straker-Squire and D. P. F. are both standard models, or stock models as known in America, and their showing remains as one of the creditable performances of the race and points to the possibility of greater interest next year in stock-car racing. The Straker-Squire lost 20 minutes, due to a broken gasoline pipe, and otherwise would have made a close finish.

#### Straker-Squire Standard

The Straker-Squire cars are notable for having the shortest-stroke engines of all the competitors; the wheelbase also is very short—a point which was of advantage at the hair-pin on the mountain road. Extreme lightness was aimed at, in view of the climb at Snaefell, and the effect of this, combined with the short wheelbase, has been counteracted by the adoption of special springing and other constructional details, so that the cars held the road well at speed. New type 815 x 105 detachable wheels were used.

Tabulation Showing the Weight, Time, Speed, Etc., of Tourist Trophy Cars

No.	Name	Bore and Stroke	Time	Speed	Weight
1	Minerva	90 x130	11:40:44	51.37	2596
2	Humber	82 x156	Out in lap 11	...	3005
3	Straker-Squire	93 x120	11:22:50	51.37	2884
4	Sunbeam	81 x160	10:37:49	56.44	2464
5	Star	90 x129.5	Upset lap 6	...	2448
6	Vauxhall	90 x130	Upset lap 13	...	2408
7	Adler	82.7 x154	Out in 2d lap, mech. trouble	...	2690
8	D F P	70 x130	12:24:01	48.38	2528
9	S A V A	82.95x150.48	Out 3d lap, mech. trouble	...	2822
10	Hudson	96 x114.3	Burst flywheel. Did not start	...	2492
11	Crossley	81 x158.8	Out lap 11, mech. trouble	...	2708
12	Minerva	90 x130	11:22:20	52.76	2692
13	Humber	82 x156	Out 2d lap	...	2832
14	Straker-Squire	93 x120	Out 10th lap, broken piston	...	2856
15	Sunbeam	81 x160	Out 1st lap	...	2480
16	Star	90 x129.5	Out 5th lap	...	2408
17	Vauxhall	90 x130	Out 1st lap	...	2408
18	Adler	82.7 x154	Out 2d lap	...	2712
19	Minerva	90 x130	10:57:38	54.74	2743
20	Humber	82 x156	...	...	2856
21	Sunbeam	81 x160	Out lap 12, broken universal joint	...	2408
22	Vauxhall	90 x130	Out lap 1	...	2320
23	Adler	82.7 x154	Out 11th lap	...	2823



## List of Entrants, Drivers and Starting Times for First Day's Race

Starting Time, H. M. S.	No.	Name of Car	Bore and Stroke, In.	No. of Cyl.	Driver	Fuel Used	Country of Origin
9 0 0	1	Minerva I.....	3.5x5.1	4	— Porporato.....	.....	Belgium
9 1 0	2	Humber I.....	3.2x6.1	4	F. T. Burgess.....	Shell.....	United Kingdom
9 2 0	3	Straker-Squire I.....	3.6x4.7	4	R. S. Witchell.....	Pratt's.....	United Kingdom
9 3 0	4	Sunbeam I.....	3x6.2	4	K. Lee Guinness.....	.....	United Kingdom
9 4 0	5	Star I.....	3.5x5.1	4	Richard Lisle.....	.....	United Kingdom
9 5 0	6	Vauxhall I.....	3.5x5.1	4	A. J. Hancock.....	Shell.....	United Kingdom
9 6 0	7	Adler I.....	.....	4	.....	.....	Germany
9 7 0	8	D.F.P.....	2.8x5.1	4	Walter O. Bentley.....	Pratt's.....	France

## List of Entrants, Drivers and Starting Times for Second Day's Race

9 8 0	9	S A V A.....	3.2x5.9	4	René Berger.....	Shell.....	Belgium
9 9 0	10	Rawlinson-Hudson.....	3.7x4.4	4	A. Rawlinson.....	.....	United States
9 10 0	11	Crossley.....	3.1x6.2	4	Cecil Bianchi.....	Shell.....	United Kingdom
9 11 0	12	Minerva II.....	3.5x5.1	4	Leon Molon.....	.....	Belgium
9 12 0	13	Humber II.....	3.2x6.1	4	W. G. Tuck.....	Shell.....	United Kingdom
9 13 0	14	Straker-Squire II.....	3.6x4.7	4	F. C. Clement.....	Pratt's.....	United Kingdom
9 14 0	15	Sunbeam II.....	3.1x6.29	4	A. Lee Guinness.....	.....	United Kingdom
9 15 0	16	Star II.....	3.5x5	4	Cecil G. Cathie.....	.....	United Kingdom
9 16 0	17	Vauxhall II.....	3.5x5.1	4	W. Watson.....	Shell.....	United Kingdom
9 17 0	18	Adler II.....	.....	4	.....	.....	Germany
9 18 0	19	Minerva III.....	3.5x5.1	4	Riecken.....	.....	Belgium
9 19 0	20	Humber III.....	3.2x6.1	4	Sam Wright.....	Shell.....	United Kingdom
9 20 0	21	Sunbeam III.....	3.1x6.2	4	D. Resta.....	.....	United Kingdom
9 21 0	22	Vauxhall III.....	3.5x5.1	4	J. Higginson.....	Shell.....	United Kingdom
9 22 0	23	Adler III.....	.....	4	.....	.....	Germany

The dimensions of the cylinders are 3.6 x 4.7 inches, these proportions having been adopted for the purpose of obtaining rapid acceleration—a point of the greatest importance, especially as far as the Isle of Man course is concerned. Except for the special ratios of the second and third speeds, the gearbox and transmission generally follow standard 1914 practice, but a multiple disk clutch, which it is intended to adopt on the 1915 Straker-Squire cars, replaces the standard Ferodo-covered cone type.

## D. F. P. a Stock Car

The D. F. P. car is a standard 12-15-horsepower speed model, and it was the only French car entered for the race, and it is further the smallest of the competitors.

It has a four-cylinder engine, 2.8-inch bore by 5.1-inch stroke; forced lubrication to the crankshaft bearings and splash by dippers on the ends of the connecting-rods to the

rest of the engine; a leather clutch; four speeds forward and reverse; the cardan shaft has a universal joint at the front, and a plunging joint at the rear, and is enclosed in a tube which is anchored to the frame in the front where it spreads out in the shape of a Y.

This car is fitted with the special model Z Claudel carbureter, which has been fitted as standard on all D. F. P. cars for the last 2 years.

The maximum output given by the engine at 3,200 revolutions per minute with the standard gear ratio is approximately 3.8 to 1 on the direct drive. The car attained a speed of 80 miles per hour, and on Brooklands track it has lapped at over 70 miles.

The standard gearbox provides for four speeds. The wheels are standard Rudge-Whitworth. In connection with the wheels the tire valves obtain balance by means of steel

(Continued on page 1259)

Left—Vauxhall driven by Hancock in the Tourist Trophy Race.  
Right—Crossley car with Cecil Bianchi at the wheel





Participants in the interclub run of the Chicago Automobile Club and the Chicago Athletic Club just before starting from Peoria, Ill.

## C. A. C. Wins Chicago Interclub Run

Automobile Club Triumphs Over Athletic Association for Second Time in 7 Years by a Score of 188 to 246—Most Penalties on Second Day

**C**HICAGO, ILL., June 13—What has become America's oldest touring classic, since the passing of the Glidden, the annual interclub team match between the Chicago Athletic Association and the Chicago Automobile Club, was contested yesterday and today over a route that ran to Peoria, Ill., and return, a distance of 360 miles, and was won by the Automobile club team by a revised score of 188 for the C. A. C. to 246 for the C. A. A.

### Second Victory for Automobile Club

This match has been contested annually for 7 years and this is the second time that the Automobile club has been able to score a victory. The match is patterned on unusual lines but the idea has worked out exceedingly well and is

particularly useful in increasing the interest in touring among private owners. As a contest it hardly resembles the old-fashioned reliabilities in which the trade used to compete, but there is enough of a contest feature in it to induce owners to get out into the country. Try to get these same men out on an ordinary club run and there wouldn't be a corporal's guard, but if the appeal is first made to club spirit and then the owner's sporting instinct aroused through the contest angle, the results are most satisfactory.

In this match the penalties are for work on the car while it is in the contest, for being late at controls and for motor stops. Time out is allowed for tire troubles, which are not penalized, and in addition 5 points credit is given each team for each perfect score. Instead of being an individual test, it is a club affair and the teams are demerited instead of the drivers.

### Twenty-seven Drivers Take Part

Twenty-seven drivers drew numbers for the match Wednesday night, twelve on the C. A. A. and fifteen on the C. A. C. Inasmuch as a team is penalized 5 points for each scratch after numbers are drawn, everyone reported for the start Friday morning. In addition there were nine official cars, making a most impressive turnout. Mayor Carter H. Harrison of Chicago was the guest of honor and made the first day's run, returning from Peoria by train because of another engagement today. Frank X. Mudd, chairman of the A. A. A. touring board, was a contestant, while Walter Leininger, superintendent of streets of



The stop at the noon control at Sulphur Lick Springs on the first day of the run



## Tabulation Showing Penalizations of Cars in 2-Day Chicago Interclub Contest

Chicago Automobile Club						Chicago Athletic Association					
Driver	Car	PENALTIES		Total	Credits	Driver	Car	PENALTIES		Total	Credits
		First Day	Second Day					First Day	Second Day		
J. T. Brown	Moline-Knight	0	0	0	4	C. T. Knisely	Diamond T	1	0	1	0
A. N. Eastman	Mitchell	0	1	1	0	W. F. Grower	Diamond T	5	15	20	0
John Kercher	Jeffery	0	0	0	4	F. X. Mudd	Lozier	0	0	0	5
E. G. Watrous	Staver	0	0	0	4	A. Ortmayer	National	0	0	0	5
George Hibben	Columbia	0	0	0	4	G. B. Dryden	Cadillac	0	0	0	5
R. R. Duff	Chalmers	0	2	2	0	F. H. Judd	Knox	0	9	9	0
G. F. Kelly	Cole	0	0	0	4	S. E. Hibben	Packard	0	0	0	5
J. E. Callender	Edwards-Knight	0	0	0	4	W. W. Harless	Packard	0	0	0	5
W. Mersbach	Packard	1	0	1	0	J. E. Fadner	Auburn	0	0	0	5
H. W. Sehl	Norwalk	0	0	0	4	B. D. Jones	Stearns-Knight	1	250	251	0
D. S. Hatch	Paige-Detroit	11	10	21	0	C. F. Meyer	Peerless	0	2	2	0
C. G. Sinsabaugh	Chalmers	0	0	0	4	L. T. Jaques	Peerless	0	0	0	5
W. G. Leininger	Palmer-Singer	0	250	250	0	Total Penalization		7	276	283	35
B. B. Ayers	Cadillac	0	0	0	4	Total Credits					35
G. F. Ballou	Apperson	0	0	0	4	Final Score					246
Total Penalization		12	276	228	40						
Total Credits					40						
Final Score					188						

<b>Note.</b> —The C.A.A. had fewer points penalty but owing to its having a smaller team it was charged the full point each time, while the C.A.C., with three more cars, only was penalized twelve-fifteenths of a point. Also it had two more perfect-score cars, which cut down its demerits.											
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the city of Chicago, was a member of the C. A. C. team. Elton Lower, of the civil service board of the city, was one of the judges.

## First Day's Run Fairly Easy

The first day's run was comparatively easy because of the fine weather and good roads. The distance covered was 180 miles, with the noon control at Sulphur Lick Springs. This was half way. The arrival in Peoria was marked by a most elaborate reception at the Peoria Country Club, located on a high bluff overlooking the river. A stop of an hour was made here while the hospitable Peorians set up a light lunch and liquid refreshments. Their hospitality did not stop here, for they also gave the Chicagoans a dinner at the

Jefferson hotel, which was followed by "open house" at the Crève Coeur Club later in the evening.

The first day's run brought penalties to two cars on each team. Hatch of the Automobile club had a short circuit in his magneto, while Mersbach, a team mate, killed his motor. On the other side Grower had to take on water, while Captain Knisely stalled his motor on the steep hill running to the Country club.

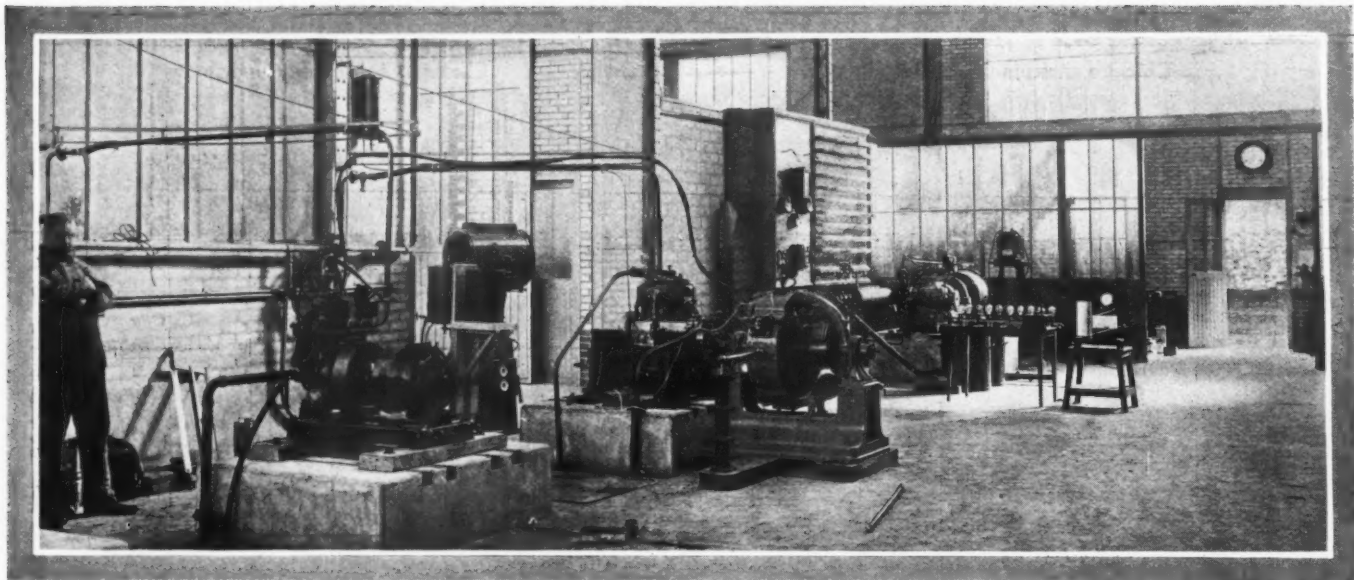
## Many Penalties on Second Day

The second day saw the penalties pile up most amazingly. The rain that threatened all morning started when the tourists were near Streator. Luckily it was after they had

(Continued on page 1257)



Participants in the Chicago interclub run grouped before the Peoria Country Club, Peoria, Ill.



General view in the test room of the automobile club of France's new laboratory at Neuilly

## French Club Has Complete Laboratory

Automobile Club of France's New Quarters Elaborately Equipped for Making Tests of Motors, Carbureters, Etc

**P**ARIS, FRANCE—Cramped in its establishment at Levallois and anxious to extend the scope of its work, the laboratory of the Automobile Club of France was removed in November last to new and enlarged quarters at Neuilly, on the suburbs of Paris. The new club laboratory consists of a handsome set of buildings on the banks of the River Seine covering an area of 45,000 square feet. There are two main halls, a chemical laboratory, a big mechanical workshop and a separate building used as offices and to house the caretaker.

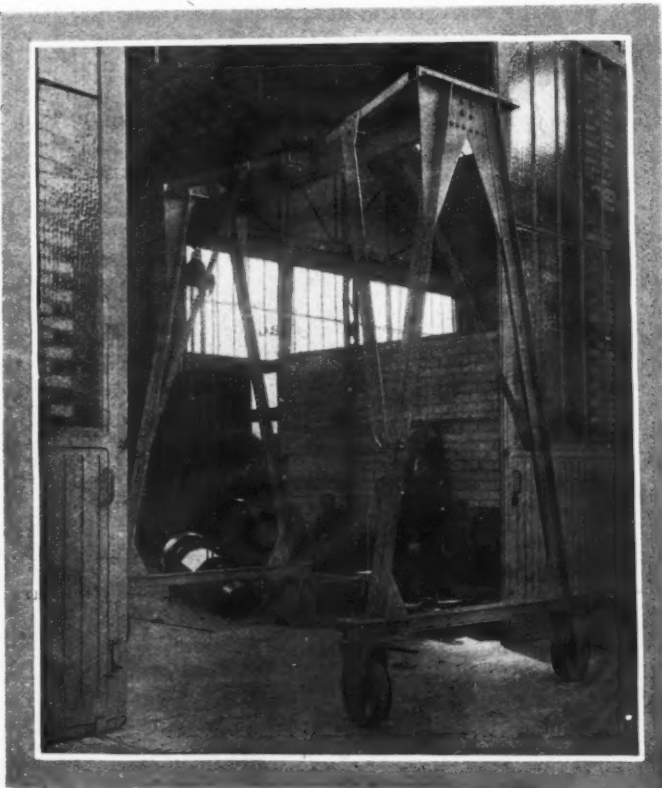
### Laboratory Is Completely Equipped

The laboratory has been fitted up in a most modern manner and is now capable of carrying out a very extensive technical program. The smaller of the two halls contains a universal platform for determining the power developed at the road wheels of automobiles and for measuring the efficiency of gearsets and transmissions. In addition, there is a Japy producer gas plant, an apparatus for measuring propeller thrust, being of the type used by the Bayard-Clement factory for testing airship propellers; also an accelerometer built on the plans of M. Auclair and intended to measure the extent of vibrations on buildings as the result of vehicular traffic. This apparatus has been built by the laboratory engineers in conjunction with a body of architects, the work being subventioned by the Syndicate of Automobile Manufacturers.

### Special Fittings for Carburetor Tests

About a dozen motors were installed in the main hall on the inauguration day, but a few of them were merely loaned for the purpose of test and demonstration. Among the permanent plants was a four-cylinder Renault of 64 by 120 millimeters bore and stroke, on which tests were being carried out with an instrument designed to prevent backfires in the carburetor. The motor had been specially modified in order to procure backfires with a view to testing the apparatus. A single-cylinder horizontal Gillet-Forest was

coupled up to a dynamo and fitted with a calorimeter for measuring the heat of the exhaust gases. A single-cylinder De Dion Bouton motor of 84 by 90 millimeters bore and stroke, driving a dynamo, was used for carrying out carburetor tests. A four-cylinder marine type two-cycle Cote



Platform used for transporting motors from one part of laboratory to another. The motor is suspended from the upper transverse beam by means of a crane



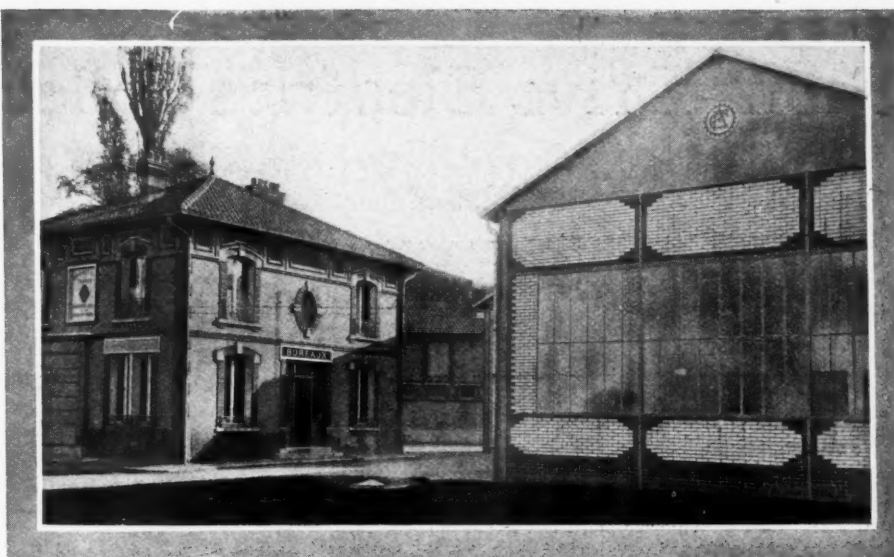
motor coupled up to a Renard brake, was carrying out fuel consumption tests with kerosene. The efficiency of mufflers was being determined with a 35-horsepower Aster motor on the Renard brake. There are two other Renard fan brakes, one of which was being driven by a 25-horsepower Peugeot motor belonging to the laboratory.

The motors are mounted on a solid reinforced concrete platform, near one of the outer walls of the laboratory, and the three fans are on the opposite side of the wall, in a courtyard. The biggest motor in the laboratory is a fourteen-cylinder, 200-horsepower Gnome fitted with an aerial propeller and mounted on the dynamometric balance. A small four-cylinder Ballot motor carried out brake tests and was fitted with the Richard cinemo-manometer for automatically registering the power developed. This plant also carried a debit-meter automatically registering the amount of fuel consumed.

#### Instruments of All Kinds

In addition to the motors the laboratory has a very elaborate equipment of instruments of all kinds. Among the more important are a regularity controller indicating the number of revolutions and establishing electric contact every 1,000 revolutions. The instrument records on a registering ribbon the number of revolutions and the time in which these revolutions are obtained, thus giving a permanent record of the regularity of running of the motor. This instrument has been designed by M. Ventoux-Duclaux, one of the laboratory engineers. The cinemo-manometer already mentioned is the production of M. Richard. Other instruments are a Hospitalier-Carpentier manograph, a Mazellier-Carpentier pressure indicator, a Chauvin & Arnoux tachometer, and a stroboscopic tachometer.

The test rooms are arranged so that each motor has a separate supply of water under pressure, and a separate



Exterior view of the new quarters of the automobile club of France's laboratory at Neuilly

water supply exists for each exhaust. The exhaust box for each motor is under water and is fitted with a syphon carrying off the hot water. The exhaust gases from the box are carried into a common external pipe and driven away by a ventilator. To facilitate the movements of motors received for testing a light portable platform is used. This can be wheeled to any position, will pick up motors carried on high trucks, and deposit them at any required position. It is sufficiently light to be moved about easily by one man, and is tested to carry 2-ton loads.

#### Special Equipment for Fuel Analysis

The chemical laboratory is specially designed for analyzing liquid combustibles and for determining their calorific power, and also for the examination of exhaust gases. There is a special department for the study of lubricating oils and greases for automobile and aviation purposes, the instruments comprising the Ventoux-Duclaux viscosimeter and the Carpentier-Lumet machine for determining frictional coefficients.

## Chicago Automobile Club Wins Interclub Run

(Continued from page 1255)

passed over the 40 miles of dirt road on the route. Still it was hard sledding and penalties accrued because of the mud.

A feature of the match was the participation of a Cadillac coupé, the first closed car that ever has been in one of these matches. It was driven by George Dryden, who went through with a perfect score, demonstrating to everyone's satisfaction the touring possibilities of a closed car.

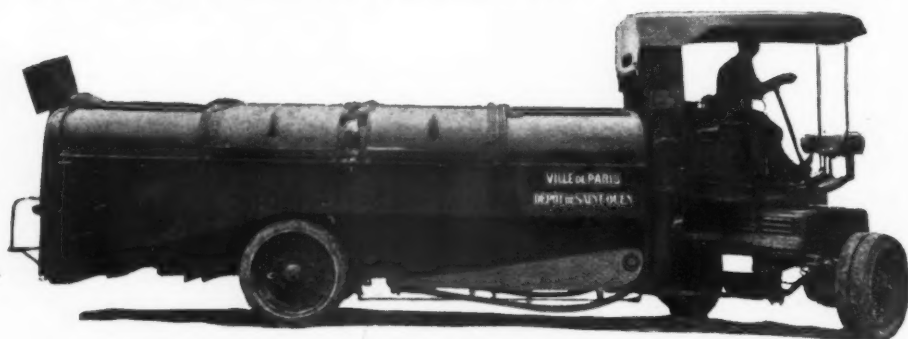
#### Motor Killings Decrease in New York

NEW YORK CITY, June 15—Fatalities due to motor cars have decreased in the City of New York, according to statistics compiled by the National Highways Protective Society. During May, 45 persons were killed in the streets. Of these, 21, or 46 2-3 per cent. were struck by wagons; 19, or 42 2-9 per cent. by motor cars; and 5, or 11 1-9 per cent., by trolley cars. Thirty-two of the forty-five were children and of the 21 killed by wagons 16 were children and of the 19 killed by motor cars 14 were children. While the total has shown a decrease the infantile fatalities have increased. Automobile drivers are more careful than horse drivers.



Mayor Harrison of Chicago, at the right, sympathizing with Fred K. Higbee, vice-president of the Chicago Athletic Assn.

# Front-Drive Electrics Collect Paris Refuse



Front wheel drive electric vehicles used for collecting household refuse in the city of Paris, France. Note that power plant is carried on pivoted two wheel chassis in front

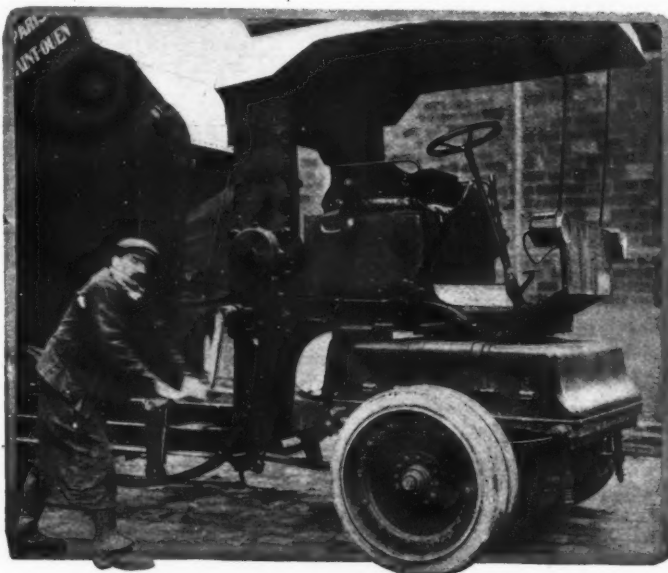
Two Wheel Chassis  
Carries  
Batteries with  
Separate  
Motor for Each Wheel  
—Main  
Frame Unusually Low

PARIS, FRANCE, June 10—After several years experimenting, electricity has finally triumphed in the scheme for collecting household refuse in the city of Paris. The old-fashioned system of using horse vehicles into which the contents of the household bins were dumped every morning, has long been condemned, but it has been a difficult matter to find a mechanical substitute. The city authorities were favorably disposed towards gasoline, but of the many test vehicles put into operation not one gave complete satisfaction. The necessity of traveling through city streets at an average speed of about 2 miles an hour, with very frequent stoppages to allow the bins to be dumped, proved the inflexibility of the gasoline type.

## Vehicles Adopted as Standard

The new electrics, which have now been adopted as standard and will gradually be applied to the whole of the city service as the present material calls for renewal, are a front-drive type. The power section comprises a two-wheel chassis on which the batteries are carried, with a separate motor driving each of the front wheels. The whole fore carriage is pivotable in the same way as the fore carriage of a horse wagon. The main frame of the garbage wagon is exceptionally low, but has a pronounced upsweep carrying it over the fore chassis. The driver's seat is built on this up-swept part of the chassis and directly above the storage batteries.

Being intended for city streets only, very little clearance need be provided. Thus the body has been brought so low that



Operation of the tipping mechanism of the electric vehicles used in the city of Paris for collecting refuse

at certain points the clearance is not more than 5 or 6 inches. This enables the garbage men to empty their bins with the least amount of inconvenience and facilitates quick work on the streets. The body is an all metal structure with a whale-



Left—Illustrating how close to the ground the dumping portions of the vehicles may be brought. Another view of the tipping mechanism employed on the Parisian electric garbage trucks



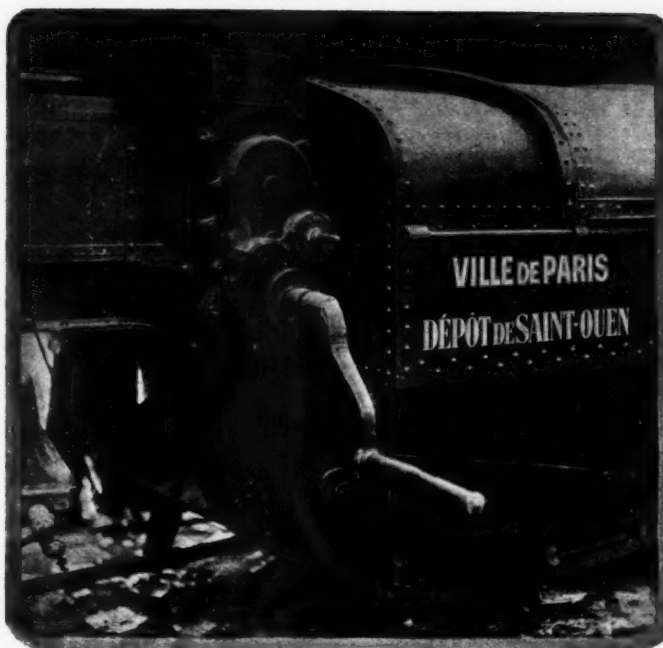
back roof and lids running on rails, making it possible to uncover portions of the interior as required. There is a considerable overhang at the rear, and this rear portion has a greater depth than any other part of the body, thus obtaining increased volume without increasing the length. The body is pivoted near the rear, and when brought to the destructors the contents are emptied by raising the fore end, the entire load being discharged without any other hand labor than that required for tipping the body.

#### Tipping Mechanism Is Very Simple

Called upon to work under the most dirty conditions and to be handled by unskilled laborers, the tipping mechanism has been simplified to an extreme degree. Sweeping down each side of the main chassis frame members are two long metal skids or runners. Pivoted to the front, lower end of the body are a pair of steel struts with a roller on the extremity of each one. These struts lay along the top of the runners and alongside the lower portion of the body, when this latter is in its normal position. Attached to the end of each strut is a steel cable passing over a winding drum placed across the frame at the back of the driver's cab. Inclosed gearing is mounted on the upright of the frame members and by the use of a crank, the heavy body can be raised with ease by a man at each side, thanks to the leverage obtainable.

#### Only One Man Makes the Trip

A team is employed in the streets to fill the garbage wagon, but when loaded it does not need to be accompanied by any other man than the driver on its trip to the destructor outside the city. With the help of a destructor attendant the driver shoots his load into the mouth of the furnace and returns to the streets for a second load.



Details of the tipping gear with crank at side of driver's seat on electric garbage vehicles used in Paris

Experiments have shown that a gasoline vehicle is only satisfactory for garbage gathering from the central markets. Here the whole of the refuse being contained within a small area very little time is lost in loading and quicker runs can be made to the suburban destructor than is possible with the electrics.

## Sunbeam Wins Isle of Man Race

(Continued from page 1253)

plates attached to the outer ends of the spokes at the opposite sides of the wheels to the valves.

The race was for cars fitted with internal combustion engines having not less than four cylinders, the cubic capacity of which could not exceed 206 inches.

The minimum weight was 2,800 pounds. This weight is the weight of the vehicle ready for the race, including driver and mechanic, oil, water, tools and other appliances, spare tires, or detachable rims or wheels with tires, but without fuel. This weight might be made up with ballast, which had to be securely fastened. The loss in weight during the race could not exceed 50 pounds.

The chassis had to conform in all respects to the requirements of the British law. The minimum width of the tread was 54 inches and the minimum length of the wheelbase 9 feet.

#### Body Size Specified

The width of the body could not be less than 34 inches to allow for two seats, measured from the outside at the seat level. If desired, the mechanic's seat could be set back on the same level not more than 8 inches.

A fuel tank of any size could be carried, but replenishments during the race could only be effected at the one official depot on the course. Means for emptying the tank had to be provided. Either gravity or pressure feed was allowed. A supplementary tank could be carried if desired.

Any kind of fuel was admitted, but the full description had to be given at the time of entry and samples submitted, and where a special fuel was used replenishments had to be made under the observation of the club officials. No fuel

was eligible for the fuel prize which contained more than 10 per cent. gasoline.

Each car was required to carry at least two spare tires, or two spare detachable wheels or rims with tires.

Only the mechanic and driver was allowed, between the start and finish of the race, to effect any repair or replacement, replenish the fuel and oil tanks, or in any other way assist the car, and all replenishments had to be taken on at the depot provided therefor.

#### Standard Oil Reduces Gasoline in West

CHICAGO, ILL., June 15—Material reduction in the price of gasoline throughout the Central West was announced by the Standard Oil Co. today and in some instances the independent companies met the decline. Reports from Milwaukee indicate that Milwaukee deliveries of 60 test gasoline will be made on a basis of 11 1-2 cents, a reduction of 1 cent from the former price. Other grades are quoted at original prices. At Kansas City a reduction from 12 cents to 10.8 cents per gallon was announced. This is a decline in Kansas City prices of 4.7 cents since November.

It is expected that the new prices will remain in force for some time as the reduction is due to greatly increased production in the Cushing fields of Oklahoma. No reports of increase in production are received from California and there is a slight decline in reduction, it is stated, in the Pennsylvania districts. The increase in production in the Oklahoma fields, it is believed, will hold the prices steady in spite of this.

Slight reductions in the price of kerosene and similar products also have become effective for the same reason.

# Why Cylinders Are Offset

## The Automobile Engineers' Forum

Purpose of Offsetting Is To Reduce Angularity of Connecting-Rods and Side Thrust of Pistons Against Cylinder Walls with the Consequent Wear—Excessive Offsetting Detrimental

### Many Engineers Favor Heating Intake Manifold

**D**ETROIT, MICH.—Editor THE AUTOMOBILE:—Motors with offset cylinders are quite common and yet the reason for making them in this way is not very generally understood. Cylinders are offset to reduce the angularity of the connecting-rod on the explosion stroke and thus reduce the side thrust of the piston against the cylinder wall and the consequent wear.

Reducing the angularity of the connecting-rod on the explosion stroke, however, increases it on the opposite side on the compression stroke, but as the compression pressure is very much less than the explosion pressure, offsetting the cylinders tends to equalize the side thrusts produced by these two pressures when carried out up to a certain point. When this point is passed, or when the offset is made too great, the side thrust on the compression stroke will exceed that of the explosion stroke.

#### Offsetting Must Not Be Excessive

With the cylinders offset the motion of the piston on the downward stroke approaches more nearly to a true harmonic motion, and on the upward stroke the motion is less harmonic. This will throw the engine badly out of balance if the offsetting is carried to excess.

The problem now arises of how much the cylinders should be offset and what benefits may be gained from it. To explain this I will work out a case by the use of diagrams:

Fig. 1 is a diagram of a 4 by 6-inch motor without any offset with the piston at middle position of the stroke. First we must find the downward pressure on the piston at this position due to the explosion and due to the compression. With the motor in question we will assume a clearance volume of 25 per cent. of the piston displacement. This would give a compression of 90.3 pounds per square inch gauge, or 105 pounds absolute. The volume of the clearance space would be 18.84 cubic inches. The volume of space in the cylinder, including the clearance when the piston has completed half the stroke, would be one-half the displacement plus the clearance, or 56.52 cubic inches. In this case we assume the expansion to be adiabatic, or, according to the law  $P_1 V_1^{1.405} = P_2 V_2^{1.405}$  in which  $P_1 V_1$  and  $P_2 V_2$  represent the initial and final volumes and pressures. As the expanding gas gives up heat to the cylinder walls the expansion would not be adiabatic but would be according to the law  $P V^n = a$  contrast with  $N$  equal to some number greater than 1.405, but for want of further data we will assume an adiabatic expansion which will give sufficiently close results.

The pressure in pounds per square inch on the piston when in the position shown in Fig. 1 and on the explosion stroke will be found by the formula:

$$P_2 = P_1 \left( \frac{V_1}{V_2} \right)^{1.405}$$

Inserting the values of  $P_1$ ,  $V_1$  and  $V_2$  using a value of 300 pounds per square inch for the explosion pressure  $P_2 = 300 \left( \frac{18.84}{56.52} \right)^{1.405} = 64.08$  pounds, per square inch on the piston. The area of the piston is 12.56 square inches. Multiplying the pressure just found by the piston area gives 804 pounds total pressure on the piston.

#### Compression Must Be Nearly Adiabatic

The compression pressure at this point of the stroke is found in like manner. The compression must be very nearly adiabatic, no heat being lost to the cylinder walls, however.

As compression is just the opposite of expansion the pressure at mid stroke may be found by the same formula used to compute the explosion pressure and assuming that the gas expands from its volume when fully compressed to the volume at mid stroke, then using the compression pressure of 105 pounds per square inch.

$$P_2 = 105 \left( \frac{18.84}{56.52} \right)^{1.405} = 22.43 \text{ pounds per square inch.}$$

This pressure, multiplied by the piston area 12.56 square inches, gives 281 pounds total pressure on the piston due to compression at this point. Having found both the pressure due to the explosion and that due to the compression we may now find what side thrust they will produce with different amounts of offset. Referring to Fig. 1, which is the diagram of an engine without offset, it will be seen that the explosion pressure acting vertically downwards will produce two forces, one in the direction of the connecting-rod and the other directly against the cylinder wall in a horizontal direction; as shown by the arrow. On the left of the figure this force is represented by the line  $P$  which represents the force in direction and magnitude, the scale being 1 inch in length representing 160 pounds. The thrust will be represented by the line  $T$  drawn from the top of  $P$  and limited in length by the line  $F$  drawn from the lower end of  $P$ , making the same angle with it that the connecting-rod makes with the vertical center line. The length of the line  $T$  represents the side thrust.

#### Explosion Thrust 225 Pounds

In like manner the diagram is laid off on the right with  $P_1$  equal to the compression pressure and  $T_1$  equal to the thrust. By measuring the length of  $T$  and  $T_1$  we find the thrust due to the explosion to be 225 pounds while that of compression is 81 pounds.

Fig. 2 shows an engine with an offset of .75 inch. From the force diagrams of the figure we find the thrust due to explosion to be 168 pounds and that due to compression 102 pounds. From this figure it is seen that the thrusts are more nearly equal.



At Fig. 3 is shown the same engine with an excessive offset of 1.5 inches. From this figure it is seen that the thrust due to the compression is greater than that due to explosion showing that the offset is too great. The truth of this has been proved by experience and it is not considered good practice to use more than about .75-inch offset.—F. C. SHEEHY.

### Great Heat Required To Break Up Low Grade Fuel

**DETROIT, MICH.**—Editor THE AUTOMOBILE:—At present we use a waterjacketed manifold, waterjacketed carbureter and hot air in the fixed inlet to the carbureter.

While we have not proved it definitely, it is my opinion that to successfully burn such gasoline as is obtainable today, either a considerable amount of heat is necessary or a very high velocity, the latter to break the fuel up mechanically. The high velocity is objectionable on account of its effects on the higher motor speeds. While, theoretically, the heating of the gas as it goes into the cylinder results in a loss of power, this is so slight as to be practically negligible; whereas, the use of a higher velocity is impractical on account of the high speed engine work necessary in the requirements of today.—GEORGE W. DUNHAM, vice-president and consulting engineer, Chalmers Motor Co.

### Waterjacketing Manifold Ordinarily Found Beneficial

**DETROIT, MICH.**—Editor THE AUTOMOBILE:—The water-jacketed intake manifold gives better results than that not so jacketed, but this is dependent largely upon other factors, as the location of the exhaust manifold, the speed of the intake gases, the shape of the intake passages, whether vertical, horizontal, or inclined, and the type of carbureter employed.—F. E. WATTS, Chief Engineer, Hupp Motor Car Co.

### Heating Intake Manifold Prevents Precipitation of Fuel

**CHICAGO, ILL.**—Editor THE AUTOMOBILE:—The conditions which retard the function of the carbureter largely confine themselves to the intake as regularly supplied on present-day automobile motors. The carbureter may perform its function very accurately and perfectly, yet these same refinements are defeated by an intake manifold which separates the gasoline from the air in which it is contained. In other words, the total percentage of liquid fuel taken in by the motor will be considerably reduced if the precipitation of the fuel is allowed to continue within the manifold. The result of this makes it necessary to correct this apparent weak mixture by an adjustment on the carbureter. When this is done there is a great sacrifice in economy as well as an "aggravated loading" on ascending steep hills. The application of heat to the carbureter prevents in a large measure this condensation and consequently allows the carbureter to perform in a manner hitherto considered impossible. We have found from frequent experiments that the loading or accumulation in the mani-

fold could be entirely eliminated by the proper application of heat.

With this in mind tests were next conducted to determine how much loss in power was the result with the manifold heated. So far the percentage lost even with the manifold heated far above the boiling point of water has been impossible to measure upon the road. In the laboratory, however, at maximum speed the percentage lost varies from 3 to 5 per cent. of the total power, but at the lower speeds there has been a gain in power as much as 10 per cent. Therefore, we believe in heating the manifold, since it has clearly shown a gain at the points where the greatest difficulties have been encountered. Another gain has been in accelerating with leaner mixtures than has hitherto been possible.—R. M. ANDERSON, engineer, Stromberg Motor Devices Co.

### Wants Old Ideas Developed in Modern Cars

**NEW YORK CITY**—Editor THE AUTOMOBILE:—According to the most recent statistics, there are nearly 1,300,000 automobiles and motor trucks of all types in use. These date from the earliest days of the industry and exemplify in their various constructional details practically every idea and experiment which has been brought out in connection with the development of the modern motor-driven vehicle. Yet, in studying these when we pass from the cars of the early days to those of 1904, 1905 and 1906, when they first began to assume the general outlines and synthetic relationship of parts which are common to the most recent products of our automobile factories, we find that certain ideas which in themselves were excellent have been dropped from year to year as the development of the particular part of the car in which they were incorporated progressed.

What I want to make clear is, why have not our engineers retained some of these features of our early cars and developed them into more modern form to be consistent with the progress shown in other parts of the vehicle? For instance, why are so many of our modern cars so fragile and inefficient as regards endurance, as compared with some of these early exponents of the art? It is true that these early cars were cumbersome and heavily built so that they were hard on tires and required a tremendous amount of fuel and lubricant. But why could not the solid type of construction have been continued at the same time with greater refinement, lightness and efficiency?—R. N. CRILEY.

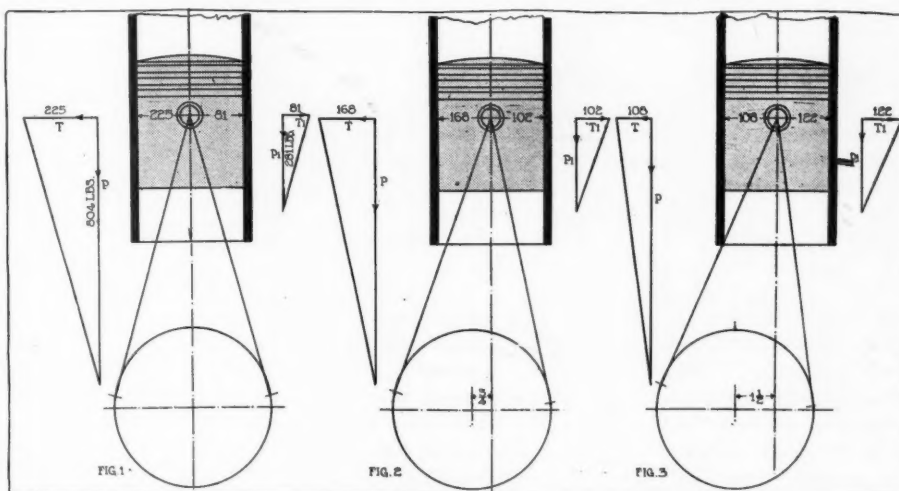


Fig. 1—The total pressure in pounds per square inch on the piston in this position is 804 pounds. Fig. 2—An engine with an offset of .75 inch. The thrusts are more nearly equal. Fig. 3—An excessive offsetting of the same engine of 1.5 inches. It is not good practice to use more than .75 inch offset.

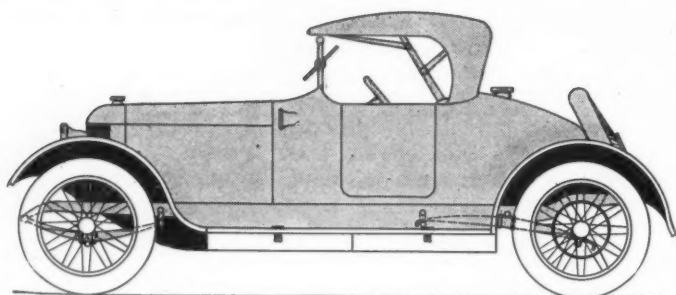


Fig. 1—Ideal car with round-nosed radiator, narrow hood, streamline body and cantilever springs. A unit power plant with four-cylinder motor is employed

## The Rostrum

### Believes Brake Pedal Movement Too Small

**E**DITOR THE AUTOMOBILE:—I notice in your Rostrum that you request your subscribers to give their opinion of the common faults in most motor cars.

I wish to call your attention to the service brakes. It has been my experience in a number of motor cars, of both high price and cheap make, that the brakes after a season's use, if adjusted to be effective do not release entirely, and if they are adjusted so that they are released entirely, they cannot be applied to bring the vehicle to a stop with anything like the quickness necessary in an emergency. This is a fault with both the external contracting brakes and internal expanding brakes and a fault that relining does not remedy. It is not peculiar to any particular make of car, but seems to be a very general fault. I believe, if the facts were known, we would find 50 per cent. of the cars on our streets today are wasting a great deal of gasoline by pulling against useless brake friction, because the brakes do not relieve entirely.

I believe the fault could be remedied by giving greater leeway by having the throw longer. On most of the foot-brakes the throw is too short. I believe that a movement of 10 inches for the foot-brake is not excessive. On a great many cars it is not over 3 or 4 inches.

#### Clutch Pedal Throw Too Small

I might mention in this connection also, that on a great many clutches, on cars particularly with a cone clutch, the pedal action is far from ideal. The pedal throw is too short and what throw there is, is mostly used in taking up the lost motion and not actually operating the clutch. I believe that if a throw of about 8 inches on the clutch pedal was made general, the entire sweep could be used in relieving the clutch; you would have much better clutch action and the leverage could be so reduced that the clutch would work a great deal more easily. In a number of cars with cone clutches, which I have operated, the pedal throw was not over 6 inches, 5 out of the 6 inches was simply used to take up lost motion and the one inch throw to operate the clutch, and when you did get to the point where the pedal operated the clutch, the fact that there was such a short throw made the clutch very hard to operate. The clutch pedal, I believe, should be fastened rigidly on the clutch and adjusted so that the lost motion would be very little and the leverage made so that the clutch

would operate more easily, this would make it easy to drive the car and also permit a better and more gradual engagement. These two faults are so common that I believe every motor car manufacturer should take them to heart.

New York City.

C. V. BECK.

### Ideal Car Has Light Motor

**Editor THE AUTOMOBILE:**—Noting the interest that has developed lately in the question of what is an ideal car, especially since the S. A. E. has taken the subject up, I would like to give you my idea. I agree with them that the ultimate car must have a light four-cylinder motor, about 4 by 7 inches, unit power plant, worm drive and cantilever rear springs but I do not approve of the type of body. It looks clumsy and is not practical. My idea of how the ideal body should look is shown in Fig. 1. It will be noted that the car has a rounding radiator, narrow hood to cut the wind, high sides to protect the occupants from dust, and a high turtle-back, in which is carried the gasoline tank and also there is space for the tools and spare tubes. Back of this is the extra wheel.

The top should be low, and the windshield a single pane of glass. The running boards should be free from boxes and the mud pan should cover the under part of the car completely.

Somerville, Mass.

C. R. N.

### Believes Two-Cycle Motor Has Future

**Editor THE AUTOMOBILE:**—Having had a number of years practical, not theoretical, experience with the two-cycle motors in automobiles I have been interested in the letters appearing in your paper regarding the same and agree with Mr. Husted as to the present attitude of some of the engineers and manufacturers.

There has been no other business, in which mechanics enter, that there has been so little mechanical knowledge as in the automobile business, both by the so-called manufacturers who in most cases were and still are only assemblers.

The two-cycle engine has been very unjustly condemned by these parties who were only hearing of the four-cycle, and as there were only three or four makers of two-cycle, they were not able to make headway against popular clamor. The two-cycle possesses what the four-cycle can never have, simplicity, low mechanical cost of production and upkeep.

While seemingly not as efficient on gas, it can use a lower grade of fuel, as I have used 1-2 gasoline, 1-2 kerosene without any trouble either in starting or running. In comparing gas consumption, I ran a three-cylinder Elmore 7,000 miles and averaged 11 miles per gallon and with a six-cylinder four-cycle of about the same horsepower get 14 miles.

The two-cycle engine has a future and I hope to hear more from its advocates.

Paterson, N. J.

H. MACGINLEY.

### How to Repair Broken Tension Rods

**Editor THE AUTOMOBILE:**—Whenever tension or other rods break when you are out on the road, and you feel that you are up against it, try and recall this handy little repair scheme. If you have a die set handy, or if you can get hold of one, a tension rod can be patched as indicated in Fig. 2 by the use of three nuts and a piece of wire.

Thread the broken ends at the joint just enough so that one end will hold just a little more than the thickness of two nuts and the other end a little more than the thickness of a nut and a half. If both are cut the same length as the first, all right. Put on nuts 1 and 2 on the long thread and put nut 3 on the shorter thread. Join the broken ends just as they were originally and then turn nut 2 until it exactly straddles the break, and then clamp 2 in position



by means of nuts 1 and 3. This clamping action gives rigidity to the rod. After that, bind as much wire around the ends of the nuts, as indicated, as you think it needs, and the job is done.

The clamping action of nuts 1 and 3 tends to pull the rod out of the middle nut but the wire, which is in tension, counteracts that pull.

Of course, this is not a permanent repair. A new rod should be put in as soon as one is available or as soon as you have time to make the change.

New York City.

W. F. SCHAPHORST.

### How To Remove Drive Shaft

Editor THE AUTOMOBILE:—1—Kindly explain the proper way to take out the driveshaft of a model 21 Buick, two-passenger runabout.

2—How do you take up lost motion in the steering wheel of this car?

New Rochelle, N. Y.

GEO. SMITH.

1—First remove the rear axle from the car by jacking up the rear end of the frame and then loosen the spring clips and brake rod connections. After this is done the axle can be pulled out. It is not necessary to loosen up the drive shaft because there is a squared slip joint at the forward end. Having removed the axle, unbolt the torque tube where it fastens to the rear axle housing and then the drive shaft can be taken out.

2—The lost motion in the steering gear may be in any one of several places. It may be in the gear housing itself, or in the drag link or tie rod linkage. Jack up the front axle so that the wheels will be free and then examine the various joints for play. If there is wear in the ball joints this should be removed by tightening up on the socket nuts. Wear in the tie rod pin joints can be eliminated by fitting new pins or bushings.

If the play is in the housing, the nut on the top of it is screwed up until the looseness has disappeared. Care must be taken, however, not to adjust it too tightly and for this reason the wheel should be tried occasionally, as the nut is turned, so that the play will be removed and yet without danger of binding the gear.

### Carburetor Should Be Heated

Editor THE AUTOMOBILE:—The two most important considerations tending to satisfactory operation of the motor are the correct design of the carburetor and ignition systems. From actual experience I find that the ideal carburetor should have these qualities. On level stretches of good road we want a carburetor that can be operated from the driver's seat, to deliver as thin or lean a mixture as possible and yet get the desired amount of power and speed. Here is where we get economy. Then when we strike hills, mud or sand where great power is needed the carburetor should admit of a change from the driver's seat where a richer mixture is admitted with the additional amount of air to give the proper mixture.

1—The Rayfield carburetor for instance seems to have these qualities, but yet I do not know for certain because the spray nozzle on the Rayfield delivers the gas through a venturi tube. What do you think?

2—Is not the venturi tube carburetor the best and does not this quality more than offset the automatic needle valve?

3—From your position and experience I would like you to inform me whether I could improve my car by installing a Rayfield, Stromberg, Marvel or Master carburetor.

4—Will not a full, hot waterjacketed carburetor give better carburetion than the non-waterjacketed ones?

5—What is the lowest temperature that gasoline can be perfectly vaporized? As I understand it, gas should enter

the cylinders as cold as possible but still be perfectly vaporized. The point I want to find out is what this temperature is and the best means to get it. Hot air and hot water with full hot waterjacketed intake manifold seems to me would give best results.

6—Do you recommend using both hot water and hot air in summer?

Beemer, Neb.

GROVER SHARP.

1—All carburetors with air and strangling controls on the dash or steering column answer all these requirements. They put the mixture entirely in the driver's hands.

2—Such questions as this one cannot be disposed of by a mere yes or a no. The fact that some manufacturers use the venturi while others do not shows that there must be something in favor of both constructions. If one were best, without any qualifications, then this design would be used exclusively. There does not seem to be any connection between the automatic needle valve and the venturi tube.

### Carburetor Action Depends on Manifold

3—The success of a carburetor depends largely on the manifold design as well as various other circumstances and therefore it is impossible to say off-hand whether any or all of these carburetors would improve the running of your car. The only way to satisfactorily answer this question is to try these carburetors one by one. Probably all of these makers would be glad to furnish you with a carburetor on the condition that you purchase it if it improves the action of your motor.

4—The general opinion seems to be that a water-jacketed carburetor is preferable because there is a better opportunity for the vaporization of the fuel; however, it is considered better by many engineers to preheat the air by bringing it into contact with the exhaust pipe, the latter being used exclusively or in connection with a water-jacketed carburetor.

5—The amount of gasoline vapor the air will carry depends upon the temperature of the air, the higher the temperature the more the air is capable of absorbing. Just the same as in the case of water; on a warm day the air is capable of holding more moisture than on a cold day. Therefore if more gasoline issues from the nozzle of the carburetor than can readily be carried in vapor form by the air at that particular temperature some of it will not be vaporized, but if the temperature of the air is raised by heating then the capacity of the air for absorbing gasoline will be increased and finally a point will be reached at which the gasoline will be completely absorbed.

In addition to this change, another condition that is effected by heating the mixture is the change in the viscosity of the gasoline, the more it is heated the more readily it flows from the nozzle and the result is that if the carburetor is adjusted for perfect combustion when the motor is warm,

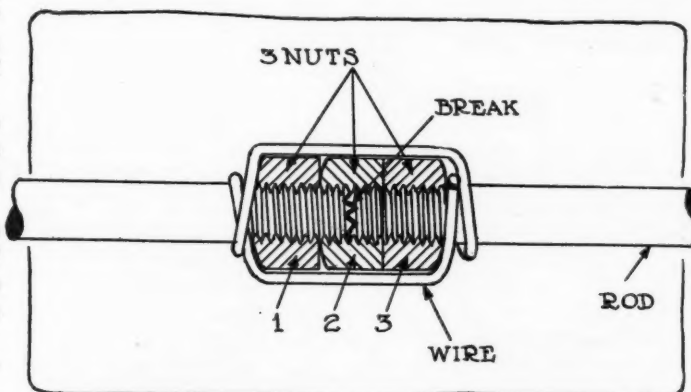


Fig. 2—One method of repairing a broken tension rod. It is simple and easily made

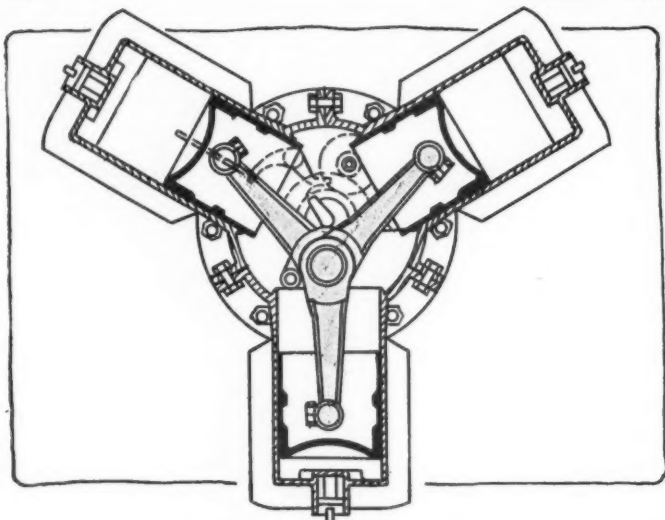


Fig. 3—Motor with rotating cylinders. This is an Adams-Farwell automobile motor. Cooling is by air, the circulation being provided by the movement of the cylinders

then, when it is first started up, the gasoline will not flow as freely as required and a weak mixture will result.

6—Whether to use both hot air and hot water in summer depends both on the carburetor and the manifold design and the best way to decide is to try the motor with and without hot air and water connections. In general, it is better to run with these connections. It is not likely to do much harm and on the other hand it will probably do some good.

#### Description of Rotary Motor

Editor THE AUTOMOBILE:—Will you kindly describe, in the Rostrum, the principles on which the revolving cylinder motor works, such as the Gnome.

Detroit, Mich.

W. C. P.

—As far as the principle is concerned, the rotary motor does not differ from the ordinary type. Suppose an ordinary four-cylinder motor had its crankshaft fastened solidly to the frame instead of the crankcase. Then, if by some means, the crankcase and cylinder block were rotated the motor would start and run, the crankcase and cylinders rotating about the stationary crankshaft. Of course, such a construction would be badly out of balance and if the motor were speeded up, the unbalanced strain would probably break the crankshaft, yet in principle this is a rotary motor.

A well-known rotary motor, here in America, is the Adams-Farwell automobile motor shown in Figs. 3 and 4. The cylinders are placed horizontally 120 degrees apart, and the three connecting-rods are attached to the same crank throw. The crankshaft remains stationary and the cylinders revolve.

#### Motor Refuses To Run

Editor THE AUTOMOBILE:—Failing to get a Buick model 35 car going and keep going, I wish you to help me.

The car was running perfectly when the motor was stopped and when ready to start her up again it would not start. I put in new breaker points on the magneto, which is a Splitdorf dual system and finally got the motor started again. I then shut off the motor and tried to start again but was unable to do so. I have tried everything I could think of. The wiring seems all good. I replaced what was bad, looked at the switch, coil and batteries. I get a very faint spark at the spark plug when pressing and depressing the button on the switch, but it seems not strong enough.

It seems funny to me that after running perfectly it should be impossible to start it. I blame the coil thinking that maybe there is something loose inside.

Indian Orchard, Mass.

ARTHUR J. PARKER.

—You do not state whether the motor refuses to operate on only the magneto and the battery or both. This is important. Crank the motor on both and note the result. When cranking on the magneto advance the spark about three-quarters of the way.

You have not stated whether the batteries are in good condition or not. Weak batteries would be a likely explanation of your trouble.

#### Battery Wires May Be Grounded

Another possibility is that some of the battery wires or the binding posts are short-circuited on the frame. This might prevent the operation of the ignition not only on the battery but also on the magneto. Go over all connections carefully looking for this trouble.

It may be that the original cause was dirty breaker points and that when you replaced these with new ones you did not obtain the correct adjustment. The points should be set about 1-32 inch apart but if the motor will not run with this adjustment vary the gap. When it is increased the motor may not run at all while if it is diminished it may not function correctly at high speeds.

#### The Purpose of the Auxiliary Exhaust

Editor THE AUTOMOBILE:—1—Will you please tell me the advantages of an auxiliary exhaust,

2—Also how to operate same on a model T Ford, racing car, and if you think same would be successful.

Jackson, Miss.

A. C. SMITH.

—1—The points in favor of the auxiliary exhaust are that it reduces the back pressure and keeps the motor cooler. The auxiliary exhaust port is situated at the bottom of the cylinder, and when the valves are opened as the piston nears the bottom of the stroke, probably half of the gas rushes out of this port. Thus the emptying of the cylinder is accomplished in half the time that would be required with one set of valves. In other words, the exhaust valve opening can be delayed a certain amount and thus the gases can be expanded to a lower point and yet the proper evacuation of the cylinder will not be interfered with.

#### Motors Must Be the Same

However these statements only hold true when speaking of two motors, identical, except that one has a set of auxiliary exhaust valves. That is, the main exhaust valves of both motors are the same size. It is perfectly obvious that in the ordinary motor the same result may be obtained by enlarging the main exhaust valve and with much less complication.

Also the main exhaust valve is kept cooler because a smaller quantity of gas flows past it. Therefore, there is less chance of the valve warping and leaking. This consideration, however, is not of as much importance now as it was a few years ago for the reason that the valves of the present day are less liable to warp.

Slightly improved cooling will result from the use of an auxiliary exhaust because the hot gases are in contact with the cylinder walls for a shorter time.

2—It would be impossible to fit a mechanically operated auxiliary exhaust to a Ford because you would require an extra set of valve pockets with the corresponding valves, push-rods and camshafts, and the only way to add this feature would be to make a new engine.

A simpler way of obtaining this auxiliary exhaust feature, one that has been used to some extent on aeroplane and racing motorcycle motors, is to drill a series of holes in the cylinder at the lower end of the piston stroke so that the piston will uncover them and allow the gas to escape after it has done its work. However this plan has the objection



that it would weaken the cylinder casting, and interfere with the proper running of the motor at slow speeds; and furthermore the holes could not be drilled all around the cylinders due to the valve mechanism and adjacent cylinders being in the way.

### New Plates for Slipping Clutch

Editor THE AUTOMOBILE:—I have a four-cylinder 1909 model KA Maxwell. The clutch slips when pulling a hard hill on high gear, or on the level when speeded up to 45 miles per hour. I have washed out the clutch with kerosene and mixed the oil with half kerosene which makes it take hold abruptly enough and seems all right, but still does as above stated. Give me a remedy if you can and also let me know if it has an adjustable clutch.

Marietta, O.

C. B.

—It is most probable that your clutch plates are worn out and there is very little use in trying to adjust it. It may be adjusted by screwing up on the sleeve nut at the back of the clutch but you will probably find that this will not improve the action. Only the plates with the offsets on them need to be replaced.

### Motor with Long Stroke More Powerful

Editor THE AUTOMOBILE:—Which has more power, a motor with a 4 by 5-inch bore and stroke or one with 4 by 6-inch bore and stroke?

White Plains, N. Y.

J. R.

—The motor with the 6-inch stroke will have more power because its piston displacement is greater and therefore it is capable of drawing in a larger charge per stroke. This of course preconceives the fact that all other essential features of design are the same.

### Questions on Oakland Model 35

Editor THE AUTOMOBILE:—1—Kindly tell me through the Rostrum how to align my model 35 Oakland, as last week I had the misfortune to bend the front axle and break the spring clips on the rear axle, thus putting all wheels out of alignment, although the wheels themselves are true.

2—Is there any difference in the tread of the front and the back axles. Some cars I understand are built with the back axle an inch or so shorter than the front.

3—How do you adjust a slipping clutch on this model. Is it much trouble?

4—Can the rake of the steering gear on this model be lowered, and, if so, how?

Regina, Sask.

DR. SEYMOUR ROSS.

—1—This is a repair that should be given to a man with experience. The front wheels should be .25-inch nearer together at the bottom than at the top and the same distance nearer at the front than the rear.

2—The tread of the front and back wheels is the same.

3—There is no means of adjusting the clutch on this model. A slipping clutch on this car is ordinarily due to one of two things, either the clutch surfacing is worn out or it has become soaked with oil. In either case the only remedy is a new facing.

4—The steering gear can easily be lowered. The housing is attached to the frame by means of a swiveled clamp and by loosening this member the rake of the steering post may be made as much as desired.

### Suggests Combining Cooling and Lubricating

Editor THE AUTOMOBILE:—Combining the cooling and lubrication systems seems like a radical suggestion, but after putting considerable thought on the subject it seems quite feasible. The common cooling and lubricating medium

would, of course, be oil, the same as is at present used in automobile motor lubrication.

There are several ways such an idea could be worked out but probably the simplest would be to have an oil radiator and a circulating pump for coursing the oil through the bearings and cooling jackets. The advantage of this scheme is that a large quantity of lubricant would be in the motor at all times and therefore there never would be any danger of under-lubrication. Also, since the boiling point of oil is very much higher than water there would be no chance of the liquid boiling away even though the car were operated for a long period on low gear or with the spark retarded.

Still another advantage is that no precautions would need to be taken against freezing, as the freezing point of a light cylinder oil, that would be used in winter, is very much lower than any winter temperature.

### Might Abolish Water Jacket

The use of oil for cooling and lubrication might even result in the abolition of the water jacket. It would seem possible to cool the motor cylinder and piston surfaces by direct contact with cool oil, the only difficulty being that this might cause over-lubrication.

Cooling in this manner might easily be accomplished by using a hollow crankshaft and tubular connecting-rods and wrist-pins. From the wrist-pin the oil could be forced out through grooves in the piston, the idea being to so lay out these channels that streams of cooling oil would reach every part of the cylinder and piston surfaces. This would require that a circumferential groove be cut in line with the openings in the wrist-pin ends and that longitudinal grooves extend from this one to the lower edge of the piston. The flow of oil through these passages should be sufficient to keep the motor cool and the only difficulty would be to put sufficient rings at the top of the piston to prevent excessive amounts of oil from making their way to the combustion chamber.

The advantages of such a system are obvious, the weight and complication of the water jackets and an extra pump would be avoided and there never would be any possibility of the motor suffering from lack of oil.

Another way of solving this problem might be to cool the interior piston surface instead of the exterior cylinder wall, as is done in the ordinary water or air-cooled design. This could be simply accomplished by allowing the oil to flow in a good-sized stream from a nozzle hole in the top of the wrist-pin center. With a piston that was as nearly dome-shaped as possible this stream of oil would strike the top of the piston and flow down the sides, cooling the piston.

New York City.

P. HAMILTON.

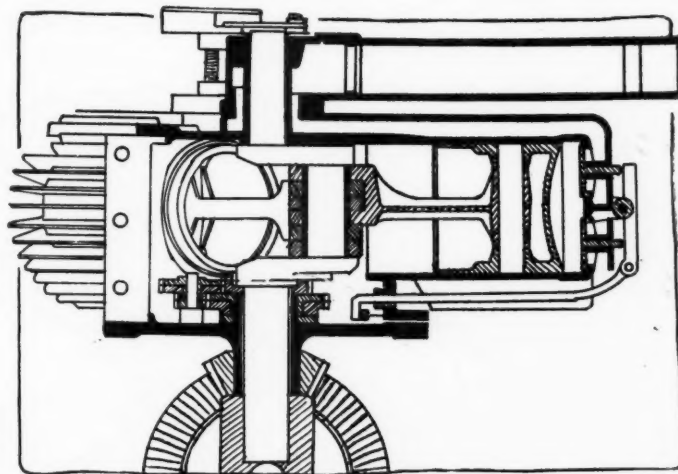


Fig. 4—Part sectional elevation of Adams-Farwell rotary motor



North Ridge Road, Cuyahoga County, O., laid 1905 with a broken stone foundation, stone curb, sand cushion, cement fillers in brick, 14 feet wide. A road of natural earth parallels the brick

## Vitrified Brick and Economical Roads

*Digest of an Address on the Economy of a Vitrified Brick Road, Delivered by Will P. Blair, Secretary of the National Paving Brick Mfrs. Assn., Before the First Canadian and International Good Roads Conference in the City of Montreal*

**I**F a paving material possesses worth, the time has come when the public should know it. If a paving material is unworthy in any way the truth is worth more to the public now than a season of repenting in sack cloth and ashes.

There are involved in the economy of a road: Its first cost; its use; and its up-keep.

These elements of economy bear a close and distinct relation to each other. Each must sustain a harmony of relationship with all combined.

The cost, therefore, must be commensurate with its use and its use must be sufficient to justify its upkeep. Its upkeep must be within bounds justifying its maintenance.

There are other elements in the matter of road economy that must be considered. The effect of the road itself upon abutting property, whether detrimental or injurious. The effect upon its users in a way that pertains to their comfort and pleasure.

### Local Supply of Material a Factor

Aside from quality, aside from cost and maintenance, local supply of that which may be used is necessarily a matter to be considered and a feature that must affect very seriously the economy of any road improvements. Good judgment therefore, will often select a road material by the weight of such consideration that otherwise would not be chosen.

Cost of construction and cost of repair and all else are

not the full measure of economy. But the greatest element affecting the economy of any road is, strange to say, the very one that is least taken into account, and that is its out-of-repair condition. The road that calls for the most frequent repairs is the road that is most likely to be out of repair and it is the road that in the sum of lapses of time in which it is out of repair, aggregates a total detraction from the road's worth which by the lesser load hauled, the broken spring, the injured horse, the extra wear and tear of the vehicle, if converted into dollars, would often equal in a short period of time the entire original cost of the improvement.

When a road is out of repair your road investment is bearing no interest. The road as a whole is only as good as its worst portion, even the rule of averages will not apply. On the other hand by inverse ratio the road approaches its maximum worth as repairs are eliminated. The road, therefore, from which repairs are practically eliminated is the real economical road, provided only that the traffic passing over it meets in a reasonable toll charge, the interest on its cost.

In both Canada and the United States poor roads exact a larger toll than good ones should or will if we ever reach a time when our roads are intelligently built.

This continued cry for maintenance is all right so long as it is made in good faith, but the trouble lies in the fact that behind much of it stands the father of the suggestion whose interest urges the building of a road that will need continued repair.



If we properly understand how a block stone road should be constructed, in order to attain its highest efficiency and best service, we must accord it a place, perhaps the first place, as affording the best economy for roads and streets, subject to heaviest and most severe traffic of every description.

The place here given to a block stone road will not be supported by assertions or any detail of testimony. This should be done primarily by the people commercially and particularly interested in block stone pavements and it is surprising that so far as the general public is concerned, they—the block stone people—do not understand, at least they do not advocate the best use of their own product. By this concession, which I confess puts the use of stone block within somewhat narrow limits, the use of vitrified brick is properly placed within the larger limits of the excessively used highways and important thoroughfares of the country.

The original cost of a brick road is not necessarily excessive. The cost of grading, drainage, bridging and the entire preparation for placing thereon the artificial foundation and wearing surface, should be alike for all types and is therefore no more expensive for a brick road than is required for the least expensive type of wearing surface. This necessary preparation in the case of a brick road bears a feature of economy that is well worth while to mention. It is not readily injured, either from wear or tear or from any character of climatic influences. It is likely to remain intact. With the brick wearing surface placed upon it, ample protection for the durability of all the work incident to such preparation is afforded.

#### Curb Is Not Needed on Brick Road

A curb for a brick highway is not necessary. A small upper lug built on the extreme edge of the concrete foundation, the height of the depth of the sand cushion, is all that is necessary.

The concrete foundation, if used, must be made entirely smooth, conforming to the grade of the finished street. Even a concrete foundation is not essential in case the subgrade contains much sand and gravel, giving a complete, ready and perfect drainage. The ideal condition is a dry sub-base. A concrete foundation, however, is advisable in most instances throughout Canada where we naturally expect a considerable season of low temperature. Over this foundation, whether of natural soil or concrete, must be placed a cushion of sand to a uniform depth from 1.5 to 2 inches, thoroughly and evenly compressed, upon which to place the brick. The interstices of the brick must be filled from the

sand cushion full and flush with the top, a mixture applied as a fluid, of the best quality of Portland cement and fine sharp sand in proportion of one to one, the setting of which shall be protected from use, uneven temperature and destructive weather elements, until completely set.

Cost and carriage of paving brick at points in the United States and Canada varies approximately from 75 cents to \$1.25 per square yard. If constructed as stated, with a quality of vitrified brick, purchasable at more than 150 points in the United States—figured and built as indicated herein at cost and reasonable profit, what has the public received in exchange for its money? A public highway at a cost that cannot be regarded as excessive, the up-keep of which at least next to or equal to that of a properly-constructed granite surface, covering a long period of years, subject to the most insignificant repairs, if any at all. As to use, such a highway surface grows better with age. Its traction resistance is at a minimum, its load-bearing strength at a maximum.

#### Vitrified Brick Is Not Dusty

Such a road originates no dust. Offal and droppings are fanned by traffic to either side of the roadway before ground into dust. Abutting property owners in no wise suffer any inconvenience and the general freedom from dust makes travel a delight. Slipping of horses and skidding of automobiles is most rare. Such roads are a pleasure and a comfort to the pedestrian. Their sanitary condition cannot be surpassed.

The economy declared herein is not founded upon theory. Neither is it based upon experimental roads of three, 4, 5, 8 or even 10 years in use. The evidence is beyond dispute.

The main street of Belleville, East St. Louis, Alton and Danville, Ill.; Terre Haute, Brazil, Richmond, Anderson, Frankfort, Lebanon, Ind.; the main street of Portsmouth, Chillicothe, Sandusky and Conneaut, O., are brick-paved. All of these streets have an average life of more than 20 years. In Cleveland and other large cities, many brick streets, including such streets as 15th, 16th, Mentor, Buhner, Holmden and Lexington avenues, have pavements whose average life exceeds 12 years.

#### Brick Road Lasts a Generation

In the face of this unquestioned evidence the life of a brick roadway can be estimated to be much beyond that of a generation. The maximum worth of such a street or road is attained by reason of its continued good condition. It is never out of commission; no out-of-repair condition; a condition satisfactory for use away and beyond a place in road economy.



Left—Center Road, Cuyahoga County, O., laid 1909, 15 feet wide

Right—Akron-Cleveland Road, of vitrified brick running through Darrowville, O.





# The Engineering Digest



## Cyclecars, in the Continental View, Merely Light and Cheap Cars Based on Radical Revision of Engineering Data

### AN ARGUMENT FOR ABOLISHING MOTOR HOODS

WHILE standardization is more and more becoming the leading idea for the production of automobiles on a large scale, the cyclecar movement tends in the opposite direction, furnishing an outlet for the constructive energy which during the past half-dozen years, or more, has found itself at variance with accepted ideas. Cyclecar builders are in fact staking their investments on the belief that the great experience which the world has gained, in building motors which will run and continue running and in making parts which will stand the strains of motoring, should render it possible now to undertake a constructional housecleaning, as it might be called, and thereafter produce a much better or much cheaper transportation machine of any class by starting afresh—with the experience gained but otherwise an unbiased mind with regard to general design and mechanical details—than those which have come down through the years burdened with superfluities and half-errors. As the matter is viewed, makeshift details of small merit were copied year after year from models which were in the main successful in the market, and some of these details became standardized and were never viewed afterwards, either singly or in their relation to the complete vehicle, in the light of all that meanwhile had become known and understood about motor vehicle construction. In nearly all cases, according to the average builder of cyclecars, a construction feature handed down from a previous year and not found particularly objectionable, or one noticed in a leading car and susceptible of imitation, received the benefit of the doubt in the comparison with any proposition to abolish or remodel this feature, provided such a proposition was based merely on reasoning, and the majority of manufacturers were too busy making hay while the sun shone, or thought they were, to launch into costly experiments at any point of construction that did not urgently demand a revision of previous work.

### The Size and the Name

It is particularly believed among the new radicalists, the cyclecar enthusiasts, that the general understanding which has been gained of essentials in motor vehicle construction should easily make it possible to chop down the cost of production by picking out the traditional features which can now be recognized as unessential and eliminating them judiciously, in whole or in part, getting the consent of the public by virtue of the lowered sales price. When the cyclecar is also conceived as a very small car, it is not because the size has anything to do with the general view of motor vehicle engineering problems of which the cyclecar is the upshot, but because small size and small price go well together and because a minimum price is a commercial necessity if the conservative public shall be made to accept anything that bears the earmarks of a radically new deal. The word "cyclecar" is a fortunate find well adapted to facilitate

this acceptance by making the new constructions appear to be a new class of vehicle, the purchase of which might confer the distinction of sporty progressiveness, and the attempted definitions of the term "cyclecar" serve the same purpose, but in the logic of events the cyclecar is simply an embodiment of the idea that it ought to be well worth the while of some energetic young engineers to clean out all the useless and cumbersome rubbish which has been accumulated in the constructional household of the automobile industry during twenty years of ceaseless acquisition and expansion, and to do this housecleaning-work with an eye single to lowest cost of production, since it has been so conclusively shown that the largest market for automobiles—and the only one susceptible of unlimited expansion in the future—lies with the masses, who will not pay as much for an automobile as for a house.

### Will Cyclecars, Too, Come to One Type?

The great variety of cyclecars already in the field fail, as might be expected, to show any unanimity with regard to ways and means to be employed in the process of simplification, and it is therefore commonly prophesied among engineers of the conservative group, who believe above all in standardization and letting well-enough alone, that faults will crop out in all the types produced and that the gradual correction of these faults will eventually bring all the little black sheep of the family, excepting those whom the bankruptcy wolf devours, back to the fold where construction work is done on the plan of safe evolution. To undertake new construction and cheap production at the same time comes anyway, they assert, under the head of "optimistic engineering," which is akin to invention, and, as everybody knows, the practical success of inventors is not measured by their enthusiasm; they are all ardent for their ideas but only something less than 1 per cent. of their number are found able to overthrow *status quo* and add a mite of their own to the data of engineering practice. Against all of which the cyclecar engineer very positively and confidently asserts that all the big progress so far recorded in automobile building is due to inventors, among whom only less than one dozen were also full-fledged engineers, while to the credit of the school engineer and his conservatism stand mainly the refinements, which come of themselves where time and money are at disposal, and those very superfluities which the cyclecar designer has made it his purpose to remove for the benefit of an expectant public.

### Probing of Data in Order

Viewing the situation somewhat along the lines indicated in the foregoing, the French and the German automobile press, with the uncompromising logic characteristic of these nations and lacking a word equal to "cyclecar," refuse to take the cyclecar as in any sense a separate development from other light little cars, and even the British have their eyes open for the abundant chances for blundering which it offers when conceived in ignorance of the early experiences of the automobile industry and therefore with disregard of the real "data" which present automobile construction represents, but it is nevertheless becoming recognized in all the European countries that the housecleaning idea is a good one and that the time has come to probe very searchingly the traditions of design and mechanics on which the automobile



industry has been living. Nothing could serve this need better than the cyclecar movement.

Among the propositions for simplification which have come up both in England and France that of abolishing the motor hood in one of the most far-reaching, as it involves changes in the appearance of the motor and a wider adoption of the plan of placing the radiator, if any is used, behind the motor and in close union with the dashboard. It also escapes the criticism to which many cyclecar simplifications are subject; namely, that they have a tendency to produce a tinny car. The omission of the hood works in the opposite direction, while the changes which it is necessary to make in the motor arrangements in order to have the innovation acceptable to the eye make for a business-like and characteristic appearance which cyclecar makers should welcome.

## Plan for Building Motors Which Will Make Cars Look Complete Without a Hood

TEXT FROM THE HUDLASS DESIGN OF 1907

MR. PEPINSTER elaborates this idea in *Omnia* of May 30 on the basis of a motor design originated and patented in 1907 by F. W. Hudlass, chief laboratory engineer for the Royal Automobile Club of Great Britain and Ireland. Mr. Hudlass wanted to produce a hermetically closed motor with all working-parts contained within its housing, and the lines on which he conceived it are shown in Fig. 1. As seven years ago nobody had yet thought of inclosed valve boxings and intake pipes, Mr. Pepinster accords to Mr. Hudlass the merits of a pioneer and continues commenting upon the Hudlass motor design as follows:

Between this armored motor and the standard modern motor there are great differences in principle which indeed are not to the advantage of the modern motor. The valve boxes of which our designers are so proud are only an artificial addition to the motor body having for its object to conceal projecting organs and especially to prevent the clicking noises from these organs from reaching our delicate ears. The Hudlass design attains the same result but by means of a higher, more elegant and more advantageous conception. By raising the valve stems, tappets and springs to the rank of interior organs, Hudlass made sure of their lubrication and obviated the leakage of oil along the tappets. By making the joint between cylinders and crankcase come at the lower edge of the waterjacket, he lightened the motor casting, as the lower half of the cylinders, acting now merely as guide for the piston, could be reduced in thickness and at all events was rid of its heavy lower flange. The general form of the motor was also improved, projections and corners disappearing while the possibility of making large apertures in the casing, as those marked *DD* in the illustration, served for better accessibility. The valve-actuating mechanism was also simplified as Fig. 1 shows.

This motor already seven years old does not seem antiquated. On the contrary, it corresponds to our actual wants and seems the logical improvement of the motor with valve boxings, which, on the other hand, seems to represent rather a

transitory solution of a problem and a compromise between two principles. So much so, that we would not be surprised to see the Hudlass motor re-appear one of these days.

This type of motor also makes excellent company for other inventions conceived in the same spirit. There is the web or table which unites the brackets of nearly all modern crankcases and is joined to the frame reaches or the false frame. This table, which in some cases serves as a continuous base plate for the motor, admits of dispensing with the drip pan; that unclean sister of the motor hood whose feeble merits as an organ of protection cannot make one forget its horrors.

There is, further, the armored magneto which is insensible to dust and defies the water hose. It might be made rain-proof as well. It has recently been completed by means of electric wire conduits which are not only insulated but water-tight, and finally a spark plug has appeared whose porcelain in hermetically enwrapped within the insulation of the feed wire. It may thus be said that the ignition apparatus of our motors counts no longer on outside assistance for its defense.

What shall be said about the carbureter? Robust and not very sensitive, it fears mainly the dust and foreign particles and its means of defense consist in screens, which by the way are made of too small area and with too open meshes. Of late years the carbureter has manifested only one desire: that of hugging the motor. And it has come to the point, in this respect, that it is now usually attached directly to the induction pipe.

The organs of the motor as well as its accessories are thus by degrees becoming inclosed, the former within the motor itself and the latter in suitable coverings. Even the control organs show a tendency to seek shelter within the crank-casing when there is an opportunity.

### Hood Now Nearly Useless

This unanimity in the search for cover implies evidently that the hood, while seeming to protect the whole mechanism, in reality protects nothing. It serves only to bridge over the lines of the torpedo body to the contours of the radiator, if the latter is in front. Some builders have even adopted perforated hoods; for, though the hood protects poorly against rain and dust, it is rather effective to prevent the motor heat from escaping.

### Less Depreciation

To be obliged to raise the large piece of tin, which the hood is, every time one may desire to inspect a spark plug or verify the oil level is at least an inconvenience, and it should also be considered that every dent or stove which the hood may receive remains an eyesore, being difficult to remove, and detracts considerably from the appearance and value of a car. The hood, the radiator, and with these the fenders, are the first members in the *ensemble* of an automobile to proclaim the premature old age which overtakes so many cars, so far as their appearance is concerned, and leads to a much more rapid depreciation than can be accepted as normal for automobiles in the long run.

The question arises: What should be done to a motor to make it get along nicely without a hood? Very little. A few sheet steel caps to close certain joints, notably around the magneto and its connections, over the spark plugs, over the oil level and the breathers. The carbureter would be perfectly contented in a fly-cage, a regular muzzle or feed screen for the motor, a metallic gauze of large area and very fine, to assure the purity of the air admitted to the combustion chambers and—what is more important with some modern carbureters—the air admitted to the interior of the carbureter jets.

Esthetic considerations, it is understood, never lose their

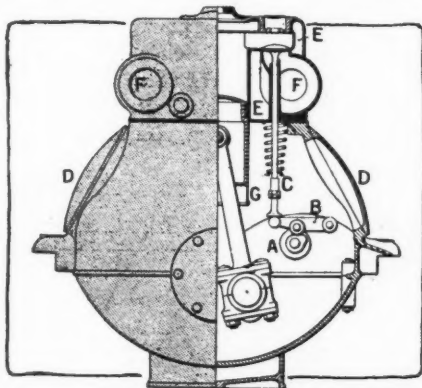


Fig. 1—Design of hoodless Hudlass motor

rights, but in mechanical construction they are served last; and it is found that they always follow the fashion. The hoodless motor would, for that matter, not have the angular contours of the present motor, but would be dealt with more generously by the designer. Having its elbows free it would expand; its knuckles and its hollows would be covered under new rounded forms.

Finally, if the hood disappeared, the radiator would not remain stupidly planted all alone at the front edge of the chassis. It would come back and lean against the dashboard and, with the hood gone, there would be no longer any objection to this position on the score of lacking air current. The surface admitting penetration of air could be made as large as necessary and, assuming that a fan would still be needful, the flywheel could take the place of the fan and could send the air from the radiator surfaces backward under the floor of the car.

#### Fifth-Wheel Steering Favored

[The author goes further and argues that, with the hood removed, the front portion of the vehicle frame could be made narrower and that then the objections to fifth-wheel steering would disappear. This could be installed with a considerable saving in cost of production and would give a steering system not only intrinsically more correct than the Ackerman system but one dispensing with the troublesome tie-rod between the front wheels, one making it easier to drive away from a curb (?) and one permitting the chassis to be pivoted to the middle of the front axle, so as to allow one of the wheels to pass over an obstacle with less shock to the occupants of the vehicle and to the motor. Other writers in the European press are also turning their eyes toward fifth-wheel steering, and a system is described by which the king-bolt becomes unnecessary, as the upper and lower portions of the fifth-wheel are held together, one of the retaining-flanges being interrupted in places, however, so that the rings can come apart when the lower one is turned back 180 degrees.—Ed.].

### Losses of Gasoline by Invisible Leaks in Unlubricated Stopcocks—Tests Show Their Importance

#### A CAUSE FOR FUEL WASTE IN MANY CARS

PROFESSOR ALEXANDER BAUMANN at the Royal Technical Highschool at Stuttgart reports tests made in behalf of a client to ascertain whether the life and tightness of stopcocks used for gasoline may be improved by the use of a lubricant which is insoluble in this fluid and how large the losses of gasoline due to leakage in the stopcocks are in both cases; that is, with and without the use of the lubricant.

The tests were made as follows: Two new faucets were secured at the lower ends, respectively, of two vertical pipes each 3 meters long, and the handles of the faucets were placed against each other, so that they could be turned by the same movement of a pair of tongs. At the upper end of each pipe there was attached a glass tube  $\frac{1}{2}$  meter long and of 4 millimeters interior diameter, behind which a paper scale in millimeters, common for both tubes, was placed. Below the faucets each pipe was closed by a tight screwcap. Both pipes were filled with gasoline, making the fluid come to the same height in both glass tubes. Then the handles of the faucets were grasped with the tongs and were turned 90 degrees around, and back, 50 times. The object of turning both faucets simultaneously and with the same grip was to equalize the test conditions. After each series of 50 openings and closings of the faucets, the lower screwcaps were

removed—the faucets being closed, of course—and one-half hour later it was observed how many millimeters the gasoline column had dropped in each of the tubes. The loss indicated the leakage through the faucet in each case. This proceeding was repeated until one of the faucets dripped strongly. In the other faucet the lubrication was renewed at intervals. The losses produced after each of the successive series of 50 openings and closings are shown in the accompanying table.

HEIGHT OF COLUMN OF GASOLINE, 4 MILLIMETERS IN DIAMETER, LOST BY LEAKAGE—IN MILLIMETERS

Lubricated.....	1	0	2	3	2	48	0	4	1	0		
Not Lubricated....	0	2	20	62	44	145	35	43	80	30		
Lubricated.....	2	5	6	1	2	5	3	4	2	1		
Not Lubricated....	140	115	160	200	135	135	194	226	215	273		
Lubricated.....	1	0	5	1	0	0	2	3	4	5		
Not Lubricated....	290	195	300	280	225	350	296	330	264	207		
Lubricated.....	0	2	0	1	0	1	1	2	4	0	1	1
Not Lubricated....	328	382	285	297	340	380	420	485	555	750	1200	1530

The renewal of lubrication did not take place with perfect regularity but was done 5 times, and each lubrication lasted for about 300 to 400 openings and closings. As the table shows, the tightening caused by the lubricant was not absolute, but the losses through the lubricated faucet were after only 100 turns (2 series) negligible compared with the losses through the unlubricated one. The exception shown in the sixth series was apparently due to the presence of some foreign substance.

The unlubricated faucet, it is noticed, became poorer and poorer, though not with progressive regularity. Probably the detrition of metal caused by the turning sometimes tightened the joint and then again was washed out. But from a certain period (after about 1600 turns of the cock) and to the end of the tests the leakages grew steadily worse. At last they became so bad that the readings from the glass tube had to be made every 10 minutes, on account of the shortness of the tube, and the figures in the table are, from that point on, obtained by multiplying by 3 the leakage observed after 10 minutes.

#### When Leakage Becomes Visible

Only when the leakage reached 300 millimeters in 30 minutes did it become visible in the form of dripping from the faucet. Below this value the faucet was only moist. The gasoline which seeped out spread over a certain portion of the metal surface and evaporated there as fast as it came out. As the tests were made in a closed room it may perhaps be inferred that in the open no dripping would be noticed until the leakage reached a value corresponding to a column of gasoline 450 millimeters high in 30 minutes. If the loss is figured out in liters for 24 hours, it follows from the data given that for each 100 millimeters the loss will amount to .06 liter per day. So long as the faucet only sweats the daily loss should not exceed .3 liter, but at the end of the test the loss became .92 liter per day and the drip from the faucet was pronounced.—From *Der Motorwagen*, May 31.

### Road Dust in Carbon Deposits

CARBONACEOUS deposits in motor cylinders have been analyzed in Germany, according to a writer in *Allgemeine Automobil-Zeitung* of May 30, and while the major portion of the deposit was found to be carbon, as expected, a considerable percentage is composed of silicon and rust (iron oxide). The presence of the silicon is ascribed to the road dust inhaled by the carbureter, the rust to the water in the air and to detrition.



## Detroit S. A. E. Discusses Cyclecars

**D**ETROIT, MICH., June 12—At a meeting of the Detroit section of the Society of Automobile Engineers, held here on June 4, W. B. Stout, chief engineer of the Scripps-Booth Company, read a paper on the "Future of the Cyclecar."

Mr. Stout has been connected with the cyclecar movement from its inception, and his investigations have caused him to modify the ideas he held when the movement was first started. In this paper he points out that while in the early days it looked as if the V-motor and belt drive were ideal for a cheap cyclecar, it has since been found that it is better economy to secure a standard clutch and gearset to be used in connection with a four-cylinder motor. He said, in part:

"The cyclecar movement started with the desire of producing the cheapest possible motor vehicle. This desire still obtains throughout the industry, but it has been learned by cyclecar makers in their experience to date that what were first considered the cheapest construction were not developed to a point which made them as advisable as was thought for the construction which was at first attempted.

"The first makers of European cyclecars placed the weight at from 450 to 500 pounds and spoke of the extreme simplicity of the V-motor, belt drive, together with tandem seating. This publicity started America along the line of similar development, for it was well known that the motors and transmissions named were plenty capable of handling the 450 to 550-pound vehicle on the narrow tread.

"On building up the cars, however, it was found that the advertising weight of 450 pounds came nearer to 750 in actual fact, while some of the cars ran up as high as 900 pounds, even on 36-inch tread. In spite of this fact the motors handled the work well, made high speed and covered long distances. The chief objection of the motor from the standpoint of the public was noise, and from the standpoint of the manufacturer, sales, while the manufacturers of cars objected very strongly to the prices which were demanded for these V-motors. In theory the V-motor is much simpler than the automobile motor, having fewer parts and somewhat less weight. On this theory it would be possible for makers of V-motors to build these for less money than a four-cylinder—the fact of the matter is that one can buy a good four-cylinder motor of greater horsepower and more reliability, of less noise and of more flexibility for less money, even including radiator and with connections, than he can buy the usual first-class V-twin.

### Standard Transmission Cheaper

"The first cars using friction and belt drive have found that they can buy a complete gearset and clutch of standard construction for less money than other belt drives, while the sales cost with this standard construction is much less than this newer drive, to which the public must be educated.

"From the standpoint of the cyclecar enthusiast who has talked V-motors and belt drives one feels that something has been lost in that the makers have in so large number left the seeming simplicity for more complication, but a close analysis shows that there is really less complication and trouble from the standard arrangement than has been enjoyed in the V-motor and belt-drive construction.

"It would seem from all of this that the cyclecar idea is being lost sight of, as so many predicted at the beginning of the movement, and that the smaller car movement only was being solved. This, however, is far from being the case.

"There is still the field of the ultra-light cyclecar, a field which as yet no manufacturer has seriously entered. This

field is the one which is to produce the simplest possible car, and it may be with the V-motor of new and simpler construction than has been offered, and with some simpler form of transmission than has been built to date, or it is possible that the car may be light enough and the motor powerful enough, so that the clutch and chain to the rear axle may suffice for all ordinary running of this car, which will sell for not over \$300. It is probable that this vehicle will be built to seat one person like a motorcycle, but with an extra folding seat which can be used for overload trips.

"The other class of car is going to a larger-sized motor, so that most of the light cars have motors around 95 cubic inches; the weights come up to 1,100 pounds and few below 900 pounds, treads 36-inch to standard, while all sorts of seating arrangements are being used.

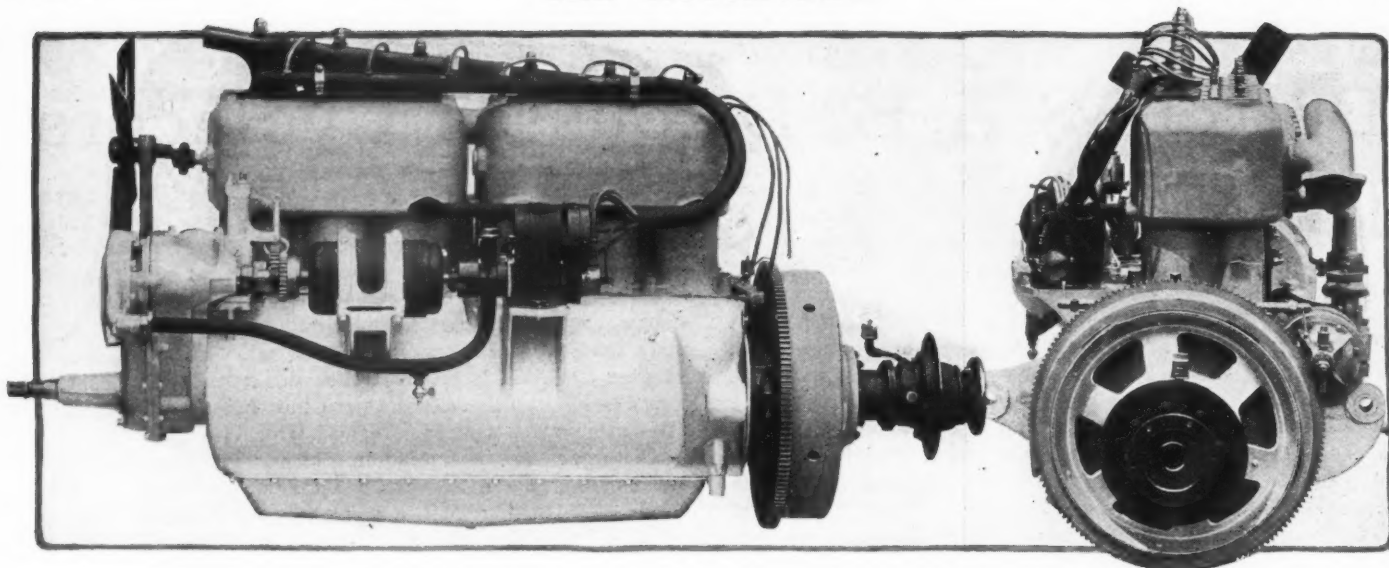
### Favors Tandem Seating and Narrow Tread

"As to cars which tried out tandem seating and narrow tread, nearly all of them are retaining this idea. A road quality has been discovered in this type of car which so far as the writer knows has never been equalled in any other type of road vehicle. There is a handiness about the narrow car in city traffic which cannot well be imagined when one realizes that these cars slip through narrow places as with a motorcycle, that they accelerate faster than big cars and stop as quickly.

"The cyclecar on the road does not run between the ruts, as has been claimed; as a regular thing it runs for the most of the time with one wheel in the rut and the other wheel on some good, smooth surface which may be outside of the left-hand rut or the right-hand rut, or in the middle of the road, or even off to one side on a path smoother than the ruts themselves.

### Public Is Educated on Construction

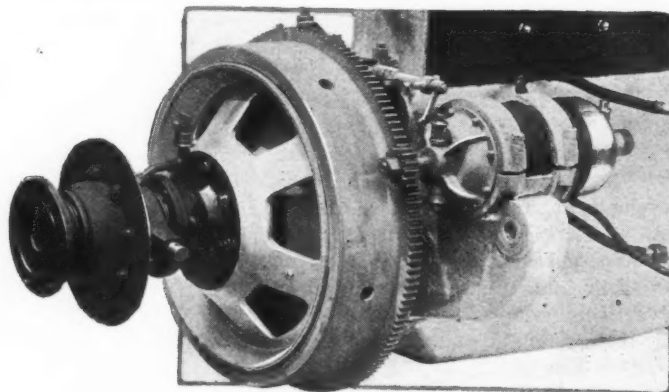
"One of the angles of cyclecar development which must not be forgotten in designing the car is that of sales. The American public is a mechanically educated public; they know construction—they know how big cars are made, they know what big car construction will do and ignore the limitations of these constructions which have become common and which they are used to. A cyclecar owner will stand twice the trouble from a four-cylinder engine of standard construction than he will from an experimental or unusual type of motor, and this must be taken into account in cyclecar work. The man who can best understand the advantages of the cyclecar is that man who is now driving a high-priced heavy car. He knows its limitations; he knows that money alone does not produce comfort and maximum speed. He wants to get to his business and back in the shortest possible time with the least possible effort and dirt. He knows his present big car holds him up in city work, and narrow-tread cyclecars are showing him also that he is being held up in country work. As a result he is ready to buy a cyclecar when he can be shown one that has all the dignity of a big car, has all of its lines and finish, has real equipment and is luxurious in its equipment. The future will see cyclecars of aristocratic construction as well as the spidery four-wheeled motorcycle at \$300. It is very probable that within the next 2 or 3 years cyclecars will be produced, costing as high as \$1,000, which will sell in quantities on performance alone. As yet it is impossible to define the cyclecar, but the writer is of the opinion that the cyclecar will be sold as a vehicle of maximum road performance under all conditions for two or three-passenger service."



Left side of motor, showing generator and magneto mounting—Flywheel end of little six

## Marmon Continues Little Six

New Electric Equipment Features  
1915 Product—Chassis Changes of  
Minor Nature — Streamline Body



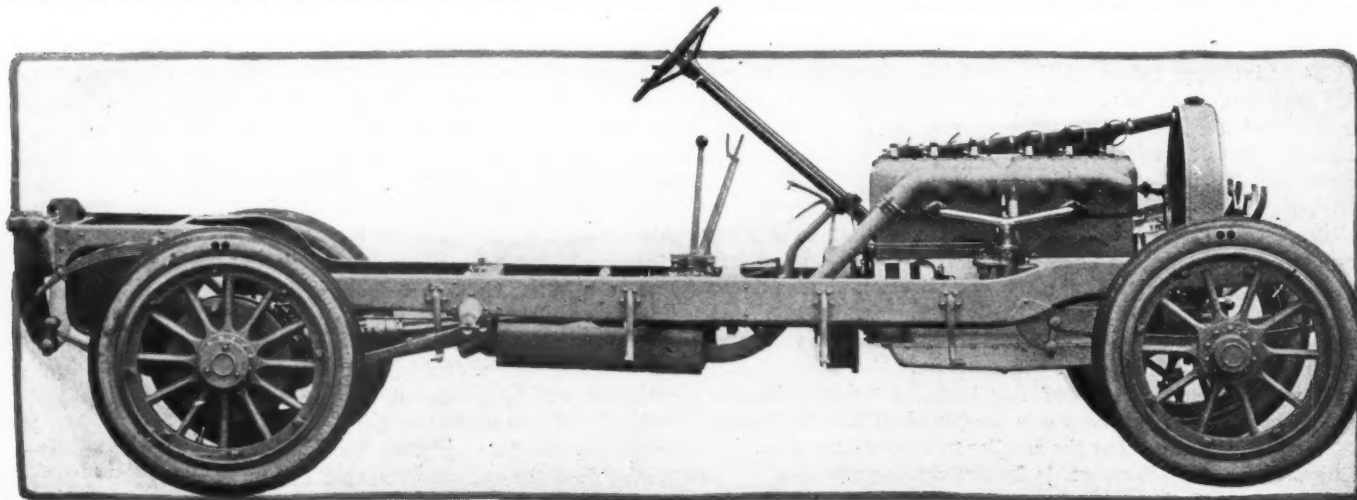
Cranking motor engages flywheel gear

**T**HE MARMON model 41 for 1915 is a refinement of the six-cylinder car which bore the same name for the 1914 season. More beautiful body lines, and several detail improvements in the mechanism and equipment render it a more up-to-date product than the Marmon car of last year.

The car as a whole is a more attractive job than its predecessor. The body lines have been smoothed out and now, conforming to the latest dictates of streamline fashion, have higher sides than the car of last year. They are further improved by a sloping hood and rounded radiator. The

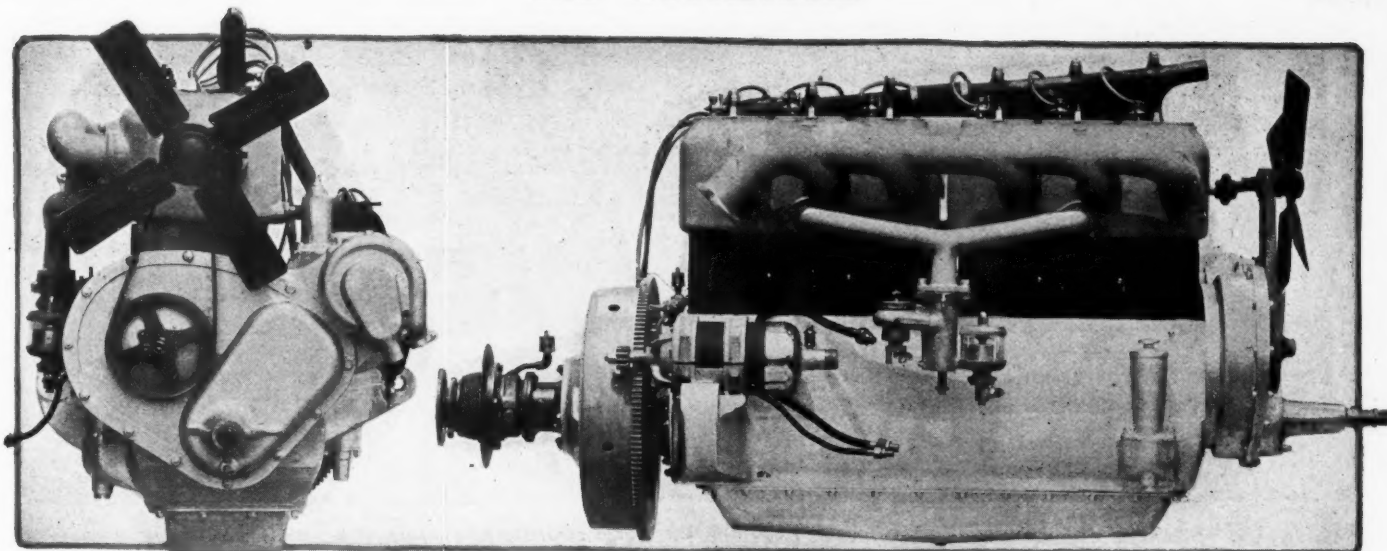
bodies are still made of sheet steel on the new car and have a substantial construction with more ample carrying space than in the previous season. Although the car is more substantially built in many ways, it is lighter than the car of 1914 because of clear running boards, a lighter top, etc. The body upholstery has wider tufting.

Conforming to the streamline form of the body the fenders have been given a different shaped camber or crown than before and the curve of the front fender into the running board is more graceful. One of the things which has increased the appearance of the car to a marked extent is



Chassis of the Marmon 41, showing motor mounting, springing and frame construction for this season





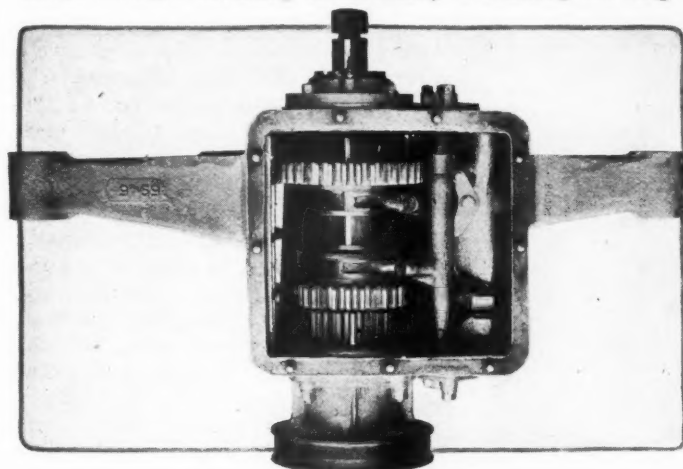
Front end of motor—Right side of motor, showing manifold connections and mounting of Stromberg carburetor

the removal of the luggage carrier and battery box from the running boards, leaving these free and clear. Provision is now made under the front seats for tool carrying instead of on the running board.

A few motor changes have been made principally for the reason that a new electric lighting, starting and ignition system has been fitted which has necessitated some changes in the exterior fittings of the motor in order to accommodate the new equipment. For instance, the water pump has been moved forward obviating the necessity of running the mag-

neto shaft through the pump, and to meet the needs of the new cranking motor and generator the supports for these members have been changed.

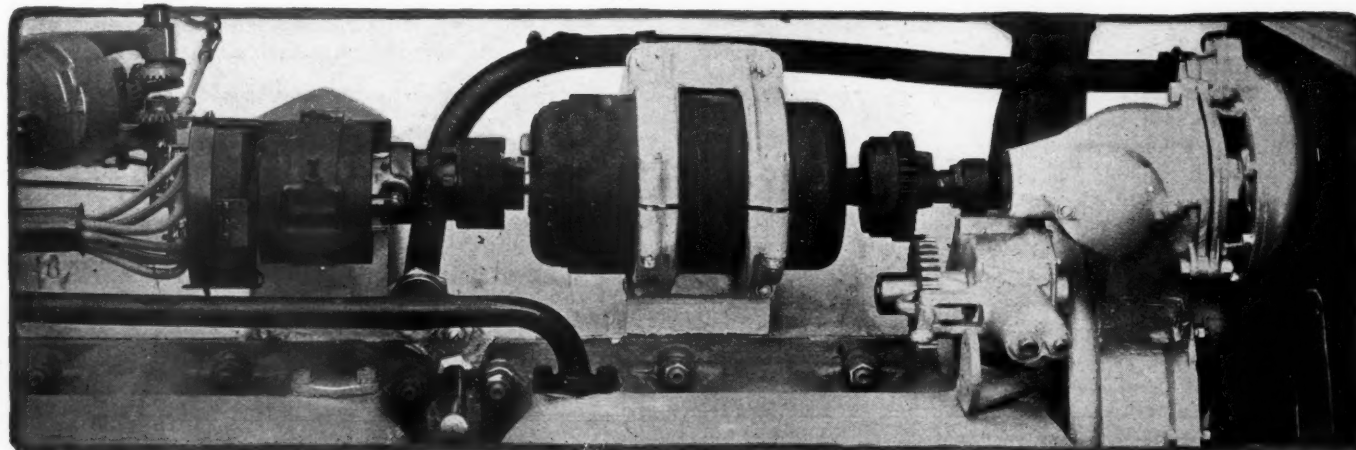
There are other motor changes however, which have nothing to do with the electrical equipment. In order to make a better assembly job, the compartment at the forward end of the crankcase containing the timing gears which was formerly cast integrally with the crankcase, is now cast separately and bolted on. This allows for more accurate finishing of the forward motor support in the three-point scheme. The pistons have been altered somewhat and this year are made 5 29-64 inches in length with three rings all above the wristpin. The upper two are concentric packing rings and the lower a concentric oil ring with nine .125-inch oil holes drilled around the circumference at an angle of 45 degrees.



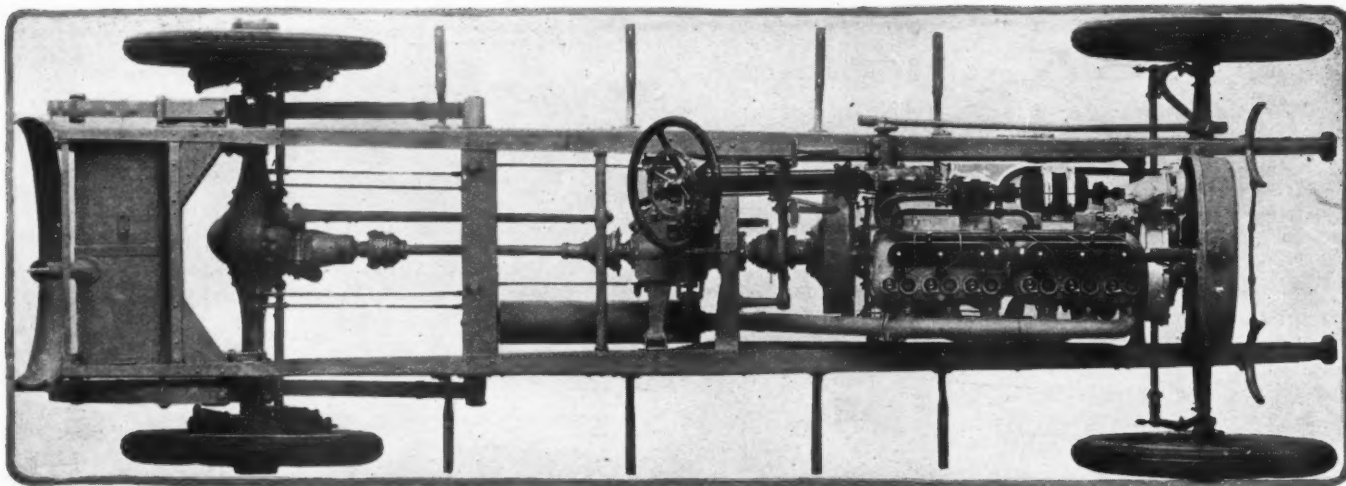
The gear box and its supports. It is suspended at three points

#### Superior Equipment Used

By far the most radical changes for the 1915 season are to be found in the equipment of the car. The Marmon is the first car to be announced with the full Bosch outfit. There is a Bosch magneto, starter and generator, all in separate units and in addition all the switches, wiring, lamps, bulbs, etc., have been bought from the same concern. For 1915 the starting motor engages with a gear connected to the fly-wheel and the starting motor commences to revolve when the pedal is depressed. In previous models the Marmon starter installation was by means of a chain drive contained



Looking down on the generator and magneto. This shows the method of driving the generator and its relation to other parts



Plan view of the model 41 Marmon chassis, showing the frame structure and layout of the driving members

in a separate housing in the rear of the motor. The present design is far more accessible. Another new feature with the Bosch installation is in connection with the starting crank. In the event of its being necessary to use this, the engagement of the starting crank automatically switches on the battery ignition and after the motor starts, it is automatically switched to magneto ignition.

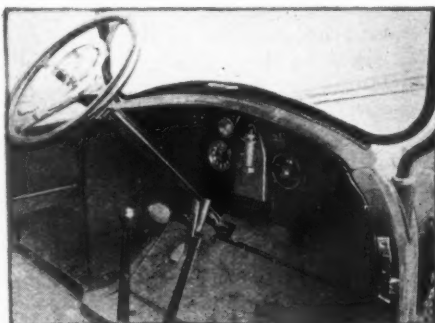
#### New Cone Clutch Adopted

A new design of clutch will be on the 41 this season. It is a cone faced with Thermoid and instead of the engaging springs being placed beneath the facings of the cone they are set in the flywheel. There are five of these disk springs arranged about the circumference. The gearset is now made in the Marmon plant instead of outside and several new features have been incorporated. The high speed engagement is by male and female gears instead of by dog clutch. A ball bearing cross shift is employed making gearshifting exceptionally easy. The radiator is of greater capacity and has the cap close to the filler opening.

Several changes can be noticed in the accessories. The most important is the adoption of the Stromberg carbureter with a full air and adjustment control on the steering column. The Silvertown cord tires as made by the Goodrich company are now fitted as standard. A one-man top is fitted as standard this year in place of to order as it was last year. In connection with the new top a different type of windshield has been adopted.

The brake cams are larger and altered to give a more powerful leverage to the brakes.

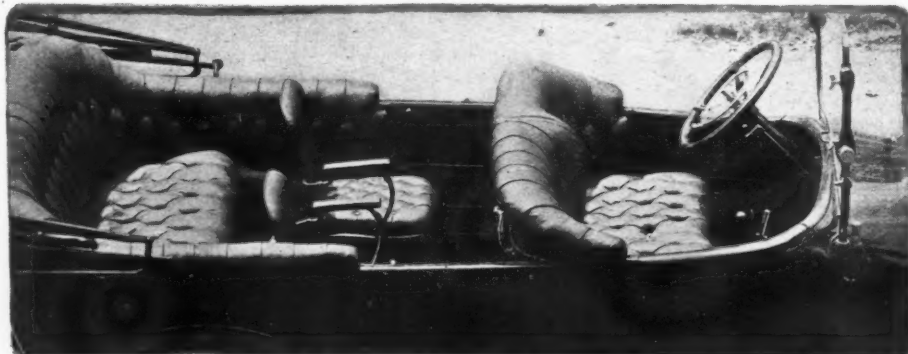
Coming to an actual description of the car it has a six-cylinder L-head power plant with the cylinders cast in three. The dimensions are 4.25 by 5.5. The cylinders are cast from a close



Instrument board is mounted under the cowl, and, besides the gauges, has a combined switch and control box for taking care of the Bosch electric lighting, starting and ignition system. Note the left drive and center control



The method of supporting the tires rigidly at the rear of the car has been continued. The construction of the tire carrier is here shown



Seating arrangement in the seven-passenger body. The small seats fold up and are out of the way when not in use

grain semi-steel and provide for a large water circulating space, and for 2.187 inch valves. The pistons are 5 29-64 inches in length and are equipped with three rings as described above. The connecting-rods are of I-beam section and have a length of 12.75 inches. The material from which the connecting-rods are made is .35-.45 carbon steel, heat-treated and forged.

The valves are operated from a unit camshaft and the valve tappets follow the cams on rollers made hollow to facilitate lubrication. The cams give a valve lift of .375 inch. The material from which the camshaft is made is .30-.40 carbon H.R.S. heat-treated steel. The crankshaft of the motor operates on seven bearings. It is a one-piece steel forging of .38-.48 carbon open-hearth, heat-treated steel and the bearing lengths from front to rear are as follows: Inside diameter 2 inches, length 2 9-16 inches. Intermediate bearings 2.125 by 1.137, center bearing 2.125 by 3.562 and rear 2.25 by 4.495 inches. The rear bearing as will be noted is of exceedingly good length in order to take the thrust of the starting motor against the flywheel.

The seven main bearings of the crankshaft are oiled under pressure supplied by a gear pump. This is driven directly off the camshaft and operates in the

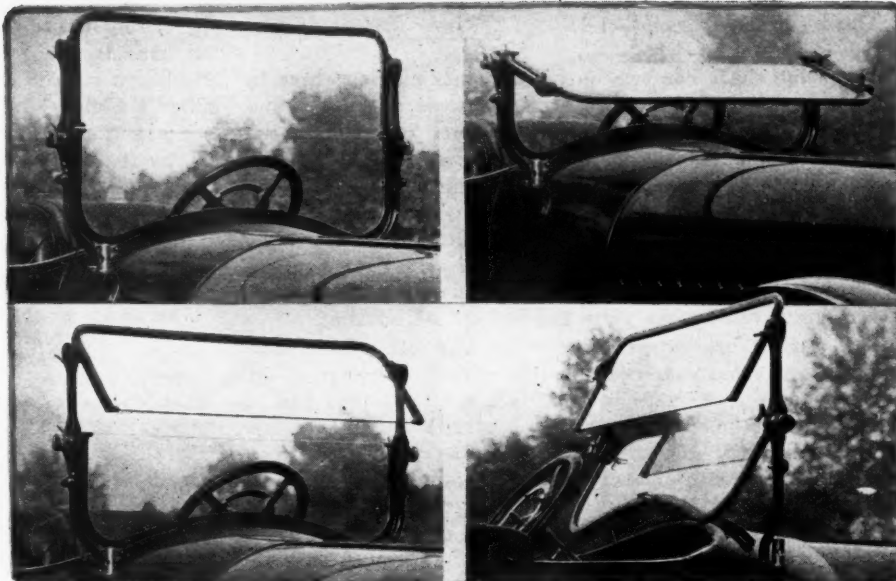


bottom of the oil reservoir in the sump below the crankcase. Leads in the crankcase carry the oil directly to the bearings and openings in the crankshaft register during entire revolution with circumferential openings in the bearing bushing. The pressure provided by the pump overcomes the slight amount of centrifugal action in the crankshaft and sends the oil through the hollow core in the shaft to the crank throws where it works its way to the lower connecting-rod bearing. There are tubes along the connecting-rods which carry the oil to the upper connecting-rod bearings. Oil is carried to the tunnel in which the camshaft operates and is passed through the hollow tappets into the valve tappet chamber. After lubricating these parts it escapes back to the oil sump in the bottom of the crankcase.

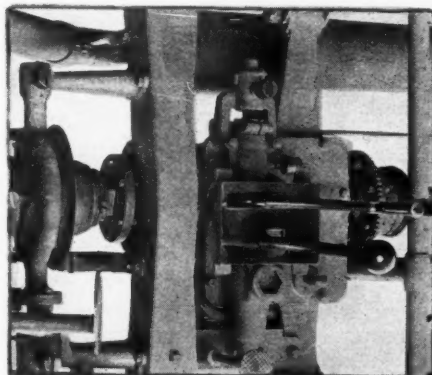
The entire electrical equipment of the car is of Bosch manufacture except the horn. It is a three-unit system, the cranking motor, generator and magneto all being separate instruments. The lighting and starting equipment is distinctive operating at 12 volts, the Bosch company claiming to have obviated the difficulty of fragile lamp filaments by means of a special tungsten alloy and a mushroom filament.

The generator cuts in at a car speed of about 12 miles per hour and at that time can carry the full lamp load. In connection with the lighting system is the Bosch-Elba storage battery which floats on the line. The battery has a capacity of 50-ampere-hours at 12 volts. The generator output is regulated by a solenoid controlled through carbon particles. The control box is mounted in connection with the voltmeter, ammeter and switch on the dash. All the electric equipment is wired by the single-wire system. The head lamps are 25 candlepower and the other lamps are all 8 candlepower. The positive side of the electric current is grounded.

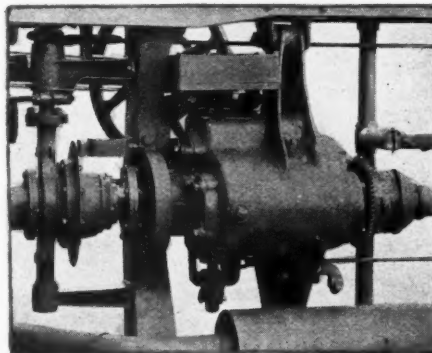
The cranking motor is a 12-volt series-wound Bosch instrument and is capable of spinning the model 41 en-



The Rostand type of windshield, which is a stock equipment this year, can be put in any of the above positions



Speedometer drive from above



Speedometer drive from below

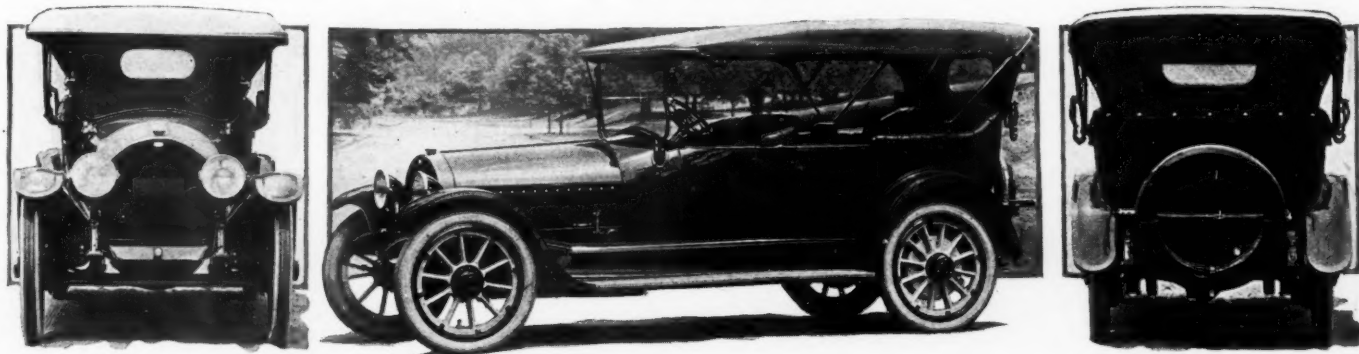
gine at from 120 to 150 revolutions per minute under average conditions. The starting switch is controlled by a plunger mounted on the floor board of the car and operated by the left heel. The over-running clutch is eliminated.

The gasoline feed and the carburetor used for the 1915 car are different from the outfit employed last year. The Stromberg carburetor is now fitted and is provided with both a strangling and air adjustment on the steering column. The gasoline feed is a vacuum device instead of the pressure feed.

#### New Cone Clutch

As has been stated the cone clutch with the circular spring steel disks in the flywheel member is an innovation this year. This clutch has been above described.

The amidship gearbox which has not been changed provides three forward speeds. It is mounted flexibly at three points and slopes slightly to the rear. The gears are made from 3 1-2 per cent. nickel steel, case-hardened and each tooth tested on a scleroscope for hardness. The gear shafts are .45-.55 carbon chrome oil-tempered steel. The gear reductions in the gearset are as follows:



Front, side and rear views, of the seven-passenger body mounted on the model 41 chassis. Equipment shown is standard

Third—direct. Second—1.63 to 1. First—3.36 to 1. Reverse—4.33 to 1.

The drive shaft has two universal joints making three in the entire drive as there is one also between the clutch and the gearbox. In connection with the joint just behind the gearbox is mounted the speedometer drive gear. The material used in the drive shaft is .30-.40 carbon, H.R.S. heat-treated steel.

The rear reductions provided as standard are as follows: 3 1-18 to 1; 3.50 to 1; 3.77 to 1; and 4.08 to 1. The housing is of pressed steel and roller bearings carry the differential. A large removable cover plate is fitted on the housing.

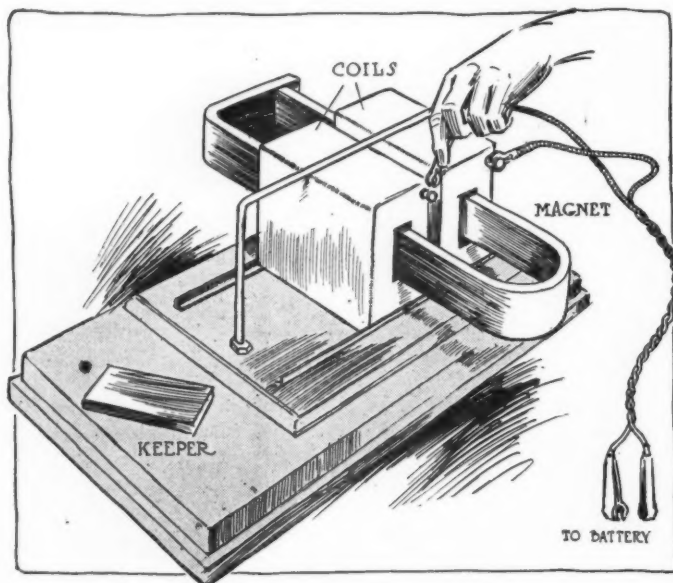
Both sets of brakes are mounted on the rear wheels. One set is an external contracting outfit with a diameter of 17 inches and a face width of 2.5 inches. The other set is internal expanding with a diameter of 16.625 and a width of 2.5 inches. The surfaces are asbestos fabric working against pressed steel drums which are bolted to the wheel hubs and also held by clips, to the spokes. The front axle is an I-beam drop forging heat-treated and provided with spindles and steering connections which are also heat-treated. The front axle bearings are conical rollers. The steering gear is a worm screw and worm wheel design with the shaft carrying the steering arm having an outboard bearing mounted on the top of the frame. The steering wheel is 18 inches in diameter mounted on a cast-aluminum spider.

The wheelbase is 132.5 inches and the tires are 36 by 4.5 all around. The springs are three-quarter elliptic rear and semi-elliptic front with Truffault-Hartford shock absorbers in the rear. The gasoline tank is of seamless steel having a 25-gallon capacity and is fitted with a long-neck filler and a Triumph gauge. The entire equipment of the car is up to date with a one-man top, Hartford tire pump, Warner speedometer, clock, etc. The car sells for \$3,250 with the five-passenger body and \$3,350 with the seven-passenger body, a four-passenger, roadster and speedster all listed at \$3,250 are standard.

### Rule of Reason for Kentucky Motorists

LOUISVILLE, KY., June 12—On June 12 the new automobile law passed by the 1914 Kentucky legislature becomes effective.

The law forbids the driving of any vehicle at a speed greater than is "reasonable and proper." The following are limits placed as "reasonable and proper," any greater being *prima facie* evidence of unreasonable and improper speed.



Seanor recharging outfit for horseshoe magnet magnets

In closely built-up sections of incorporated cities 10 miles an hour is fixed; in residence districts, 15 miles an hour; highways outside of the business and residence sections, 20 miles an hour. On a curve, corner or crossing, where the operator's view is obstructed, 8 miles an hour is the limit.

The framers of the law were generous in providing fines and equally unselfish in finding acts which can be punished. Some of the law infractions and their penalties are:

Fine of \$10 for fictitious chauffeur's badge.

Fine of \$15 for employer of unlicensed chauffeur.

Fine of \$10 for unlicensed chauffeur.

Fine of \$15 to \$50 for intoxicated operator of motor vehicle.

Fines of \$10 to \$100 for use of fictitious automobile licenses.

Fine of \$15 to \$100 for person under 16 who drives car without parent or guardian.

Cancellation of vehicle license for owner who fails to report discharge of chauffeur because of drunkenness.

Two to 5 years in the penitentiary for taking machine without owner's consent.

Forfeiture of chauffeur's license on conviction for drunkenness.

Fine of \$10 to \$50 for violation of any section not specifically enumerated. This may be augmented by 5 to 30 days in jail.

The new license prices follow:

For vehicles of 25 horsepower or less, \$6; between 25 and 50, \$11, and above 50 horsepower, \$20.

### Seanor Garage Magnet Charging Outfit Does Work in 1 Minute

ROCK ISLAND, ILL., June 12—H. E. Seanor, of the Sauerman Motor Co., Rock Island, Ill., has brought out a magnet recharging set by means of which he claims to be able to increase by at least 20 per cent. the amount of magnetic charge. The reason he gives for the increase in efficiency is the fact that by his device the magnets are charged further up toward the shoulder than with the ordinary charging set.

The illustration herewith gives an exterior view of the device and it will be seen that it consists of a base upon which are mounted two coils contained in square boxes. Through the center of these coils pass openings into which the magnets are inserted during the time that they are being charged. In order to accommodate a horseshoe magnet of any spread, one of the coil boxes is mounted on a track, allowing the distance between the two openings to be altered.

The process of charging a magnet by this device requires but a minute. Twenty amperes are consumed during the time that the current is passing through the coils and the windings on the ordinary outfit are designed for 6 volts. While the current is on it requires a pull of 600 pounds to remove the magnet from the charging outfit and the maker states that on the ordinary type of charging apparatus this pull is only 302 pounds, according to tests recently made by a prominent magneto manufacturer in Philadelphia.

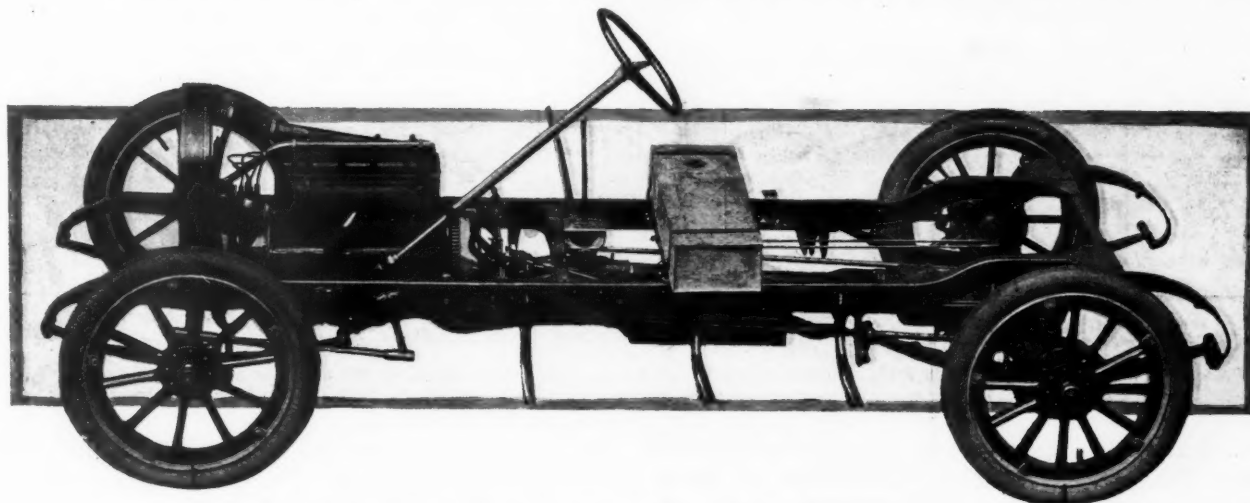
In charging a magnet the ends of the horseshoe are brought up against the iron core of the coil in proper polarity, that is, with the magnet in such a position that it is attracted and not repelled by the core. The magnet is then pushed through the apertures in the centers of the coil boxes taking the place of the iron core. The current is then connected for merely the length of time required in touching one of the terminals of the wire to the binding post two or three times. A keeper is then laid across the part of the magnet which projects beyond the coil boxes and with the keeper still in place the magnet is replaced on the magneto.

When freshly charged the tungsten steel magnet of a magneto will lift in the neighborhood of 20 pounds. Mr. Seanor states that with his device this can be increased to 30 pounds without trouble. The weight of the outfit is 14 pounds. Each coil contains 1,000 feet of wire of three different sizes. The construction is kept secret. The price will be \$30.



# Regal Concentrates On One Model

Single Overhung Chassis Model at \$1,085 Replaces Two 1914 Types  
—Automatic Advance Eliminates Levers On Steering Wheel



Chassis of the 1915 Regal, showing radiator filler inside motor hood and underslung springs

**A** SINGLE chassis model of new design throughout and selling at the reduced price of \$1,085, both in touring car and roadster styles, with full equipment, is announced by the Regal company for the 1915 market. Last year's prices were \$1,125 for the underslung and \$1,350 for the overhung types.

The new chassis marks the passage of the underslung construction, from the Regal shops, the same low center of gravity now being obtained on all cars by the use of springs hung from the underside of the axle.

Another feature of the new Regal construction is the abolition of spark and throttle control levers on the steering wheel. By the use of the Atwater Kent system of ignition, which has an automatic advance, the spark control lever is rendered unnecessary, while the control of the throttle is principally by foot accelerator. There is, however, a dash lever that connects with the slow speed stop on the carburetor and allows the operator to instantly set the motor at any desired minimum speed.

The advantages of this innovation in control are many. It removes from the operator the trouble of operating the spark lever and leaves both hands free to steer and change gears.

Hardly less interesting than this new control feature is the placing of the radiator filler inside the hood, it now being an integral part of the radiator outlet connection. This is to prevent the unsightly rusting of the radiator surface, due to the overflowing of the water when filling. It also has the advantage of giving an unbroken line to the radiator and hood, which adds to the appearance. Another refining touch is the coping of the front edge of the radiator.

The 1915 Regal is up to the minute in appearance and

construction, and reflects a great deal of study and forethought on the part of the Regal organization in order to give the public what it wants in a moderate-priced car. The touring car, with a well-designed five-passenger body, sloping cowl and hood, domed fenders and wide doors, is indeed pleasing, and should make history for the company the coming year.

Considerable reduction in price has been made, either the touring car or the roadster being obtainable for \$1,085 with complete appointments. This year's prices were \$1,125 for the underslung and \$1,350 for the overhung types.

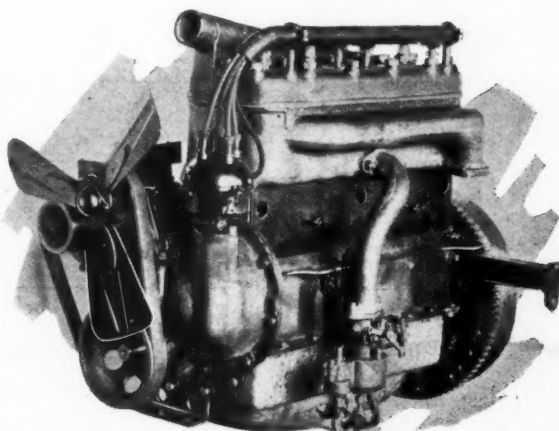
The wheelbase of the new Regal measures 112 inches, which is a compromise between the two lengths offered this year. That is, model T was a 108-inch car, while model C was 116 inches.

The Regal engineers have accomplished much in the new power plant. With a bore of 3.75 inches, which is the same as that of last season's underslung car,

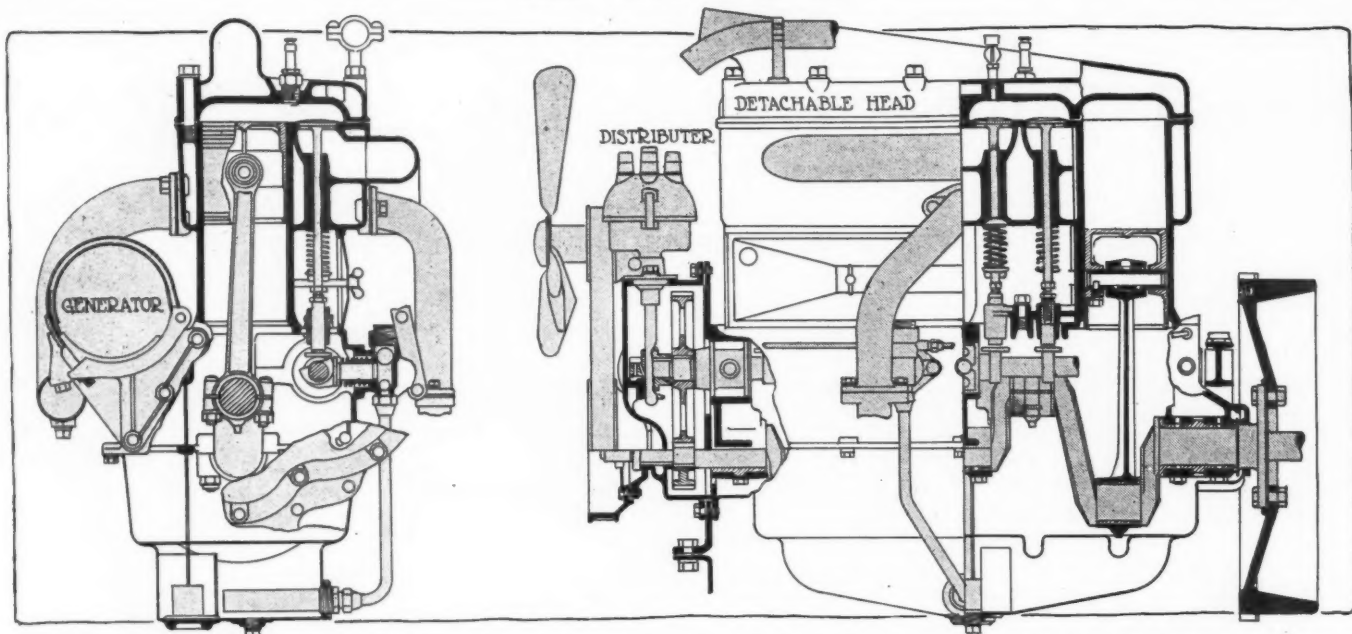
and a stroke of 5 inches, the new motor weighs exactly 151 pounds less. This weight reduction has been accomplished in a number of ways. Better balance with lighter reciprocating parts is one factor, while quite a material saving of weight is obtained by the use of a steel stamped lower crank-case instead of the former cast iron type.

The old engine had a rated horsepower of 22.5, but this new one has turned up 39.4 horsepower at 1,960 revolutions per minute, in test. This was with a 1-inch carburetor, whereas the cars for the market are equipped with a 1 1/4-inch size which is conducive to still greater power output.

The motor is suspended from the main frame at three points, and is of the block type with detachable cylinder head. The valves are all on the left side in conventional



Three-quarter view of 1915 Regal block motor, showing mounting of Atwater Kent system



Left—Part sectional front view of 1915 Regal motor, showing mounting of lighting generator. Right—Side elevation with part section to flywheel, two cylinders and timing gears

L-head form and the manifolds are of the simplest. Distribution of the gas to the cylinders is effected within the casting itself, a single opening to the carburetor intake pipe being found. The exhaust header is an integral part of the casting also and extends horizontally along the upper left side of the block to the rear where it makes a right angle turn, joining the exhaust pipe in vertical position.

The cylinder head, securely held down by fourteen bolts, carries the spark plugs and petcocks in addition to having the water outlet to the radiator from the waterjacket as a part of it.

The crankshaft is carried on three die-cast bearings, and, being of substantial size, this shaft should have very little tendency to vibration. All reciprocating parts, in fact, have been carefully designed to eliminate this, with gratifying results. The pistons are provided with three ring-grooves and below the lower one several holes are drilled in a chamfered cut which catches any oil this far up in the cylinders, and allows it to escape back to the crankcase, preventing its going out through the exhaust as smoke.

The piston rings are of unusual construction. There are really three shallow rings to each groove, making a total of nine in three sets per each piston. These are made of 1-16-inch cold rolled steel. In constructing them, a strip of steel of this thickness is first spirally wound, then pressed together and cut to make the rings. These pieces are next ground to proper size.

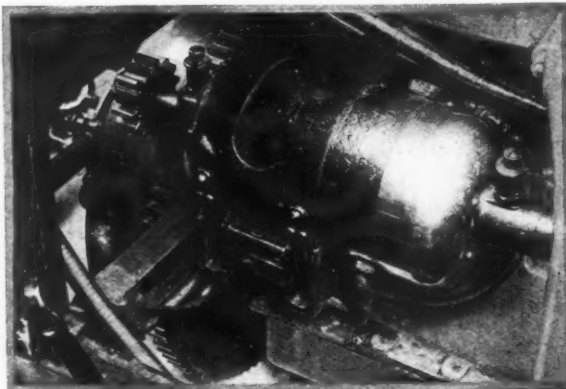
The use of this type of ring is said to prevent gas escape once the motor is worn in. In assembling them, the splits in any set of three are arranged at about 120 degrees apart. Several other well known makes of engines employ these rings, besides the Regal.

The camshaft revolves on three phosphor bronze bearings and is driven from the front by spiral timing gears completely housed. Due to the fact that there is no magneto, ignition being taken care of by an Atwater-Kent system, there are only two main gears at the front of the engine.

The spiral gearing for driving the vertical ignition distributor shaft is mounted on the end of the camshaft and housed with it. The generator which is mounted at the opposite front side is not gear driven, but is actuated by the same belt that drives the fan. This will be taken up in detail later in connection with the electrical system. Such elimination of parts—there is no outside shaft for driving any units—is another factor aiding weight reduction.

#### Lower Half of Crankcase Pressed Steel

As mentioned, the lower half of the crankcase, which has nothing to do with the mounting of the bearings, is pressed out of sheet steel, and after its various parts are assembled, the whole is galvanized. This pan has a false bottom which has grooves pressed in it and these serve as connecting-rod troughs, the ends of the rods dipping into the oil in them.



The Rushmore cranking unit is mounted at the left rear side of the crankcase and operates on the flywheel

The lubrication system is a positive force feed and splash type. A plunger oil pump operated by the camshaft forces oil through one pipe to the rear main bearing and the rear camshaft bearing, and through another to the front where it plays on the mesh point of the timing gears, serving to quiet them and prevent wear. The oil, from these points of delivery, flows down into the crankcase troughs to be splashed by the rod ends up into the cylinders. The front and center main bearings have oil pockets to catch the splash. The oil is also splashed up into the valve tappets and to the camshaft bearings. Vents in the valve covers allow breathing up through the tappet holes and eliminate a breather pipe.

The Regal cars retain the cone clutch of leather with spring inserts, and also the mounting of the gearset in unit with the rear axle.

Due to the fact that the gearset is not in unit with the engine, the flywheel is not inclosed. The inner edge of the face is provided with teeth which mesh with the pinion of the Rushmore cranking unit for starting purposes. This



electric motor is mounted on the left rear side of the crankcase on an integral bracket and is a late type brought out by the Rushmore concern—model C1. Though very compact, this motor has a 7-horsepower output, and turns a stiff motor at 140 revolutions a minute. It is geared 6 to 1 in this installation.

#### Starter Operation Is Simple

In operation, the unit is very simple. Within the armature shaft there is a spring, which, when the unit is idle holds the pinion on the armature shaft out of mesh with the flywheel gear. When in this position, the poles of the machine are out of line with the armature. The operating switch has two points. Throwing this to the first point sends a small current to the motor. This is sufficient to cause the armature to be magnetically drawn directly in line with the poles against the spring action. At the same time, the armature turns slowly, meshing the flywheel and pinion teeth. The switch is then thrown to the second point when the full current goes to the unit to turn the now-connected gasoline and electric motors. As soon as the engine rotates faster than the electric motor, the pinion is automatically thrown out of mesh with the flywheel gear.

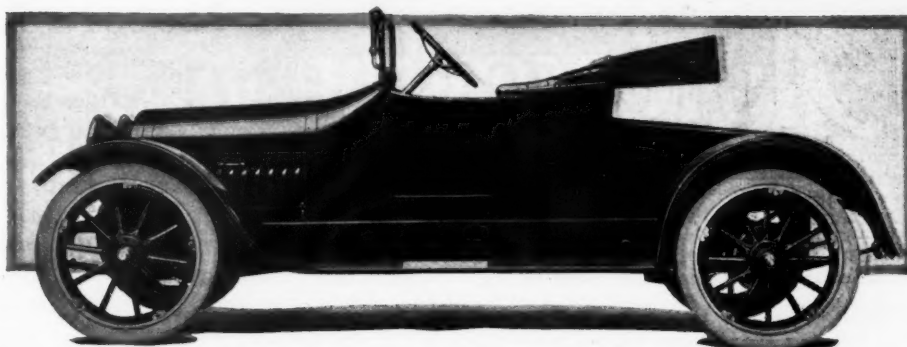
As already stated, the generator which is carried on the right forward side of the engine, is driven by a flat belt, this belt passing over the main drive pulley on the end of the crankshaft, then over the fan pulley and generator pulley. Thus one belt serves a double purpose and is a positive drive when properly tensioned. To adjust this tension, it is only necessary to swing the fan arm. The generator is driven 2.5 to 1.

There is an 80 ampere-hour Willard battery carried on the running board. The driveshaft is inclosed within a torsion tube, which has a yoked front end attaching to the middle cross member of the frame. Just ahead of this yoke the driveshaft is fitted with a universal joint. The gearset which bolts through flanges both to the torsion tube and the rear axle housing, is a Covert type and affords three forward speeds, selectively obtained.

#### New Rear Axle Design

The rear axle is a new design, lighter than that formerly used and a three-quarter floating construction replaces the formerly-used semi-floating design and is more efficient. The bevel differential has four differential pinions and the gear ratio is 4 to 1. Brakes are 12 inches in diameter and 2 inch width.

In this driving construction the torque is taken by the torsion tube and the driving thrust by radius rods on either



1915 Regal roadster, showing smoothness of body lines and absence of projecting radiator filler

side. The rear axle now used has a weight of 187 pounds.

A new design of front axle also appears, which is very much lighter than that heretofore used. The weight reduction is accomplished principally by the elimination of large spindle yokes. Those now used have a very much shorter distance between the upper and lower mountings of the spindle, which construction is said to be equally as strong as the old. To illustrate this weight reduction, it may be said that the front axle formerly used weighed 58 pounds, while the new type weighs 36 pounds.

The steering gear is a Gemmer of irreversible type and drives on the left. Control levers are in the center and the H-plate has been placed flush with the floor, which makes a very neat construction.

The gasoline tank is located under the front seat and feeds by gravity to a Stewart carbureter.

#### Doors Are 22 and 23 Inches Wide

Both touring and roadster bodies have been brought to the latest body fashion dictates and appointments are complete in every detail. Ample room for five passengers is provided in the touring car, the rear seat of which measures 47 inches across. Doors have been made wide enough for easy entrance, measuring 23 and 22 inches in width.

The complete weight of the car, ready for the road, is 2,345 pounds.

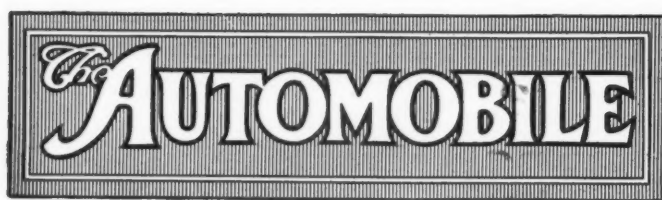
The principal dimensions of the new Regal power plant follow:

Clear valve diameter, 1 21/32 inch.  
Valve lift, inlet, 9/32 inch; exhaust, 5-16 inch.  
Motor compression, 80 pounds.  
Diameter crankshaft bearings, 1 5/8 inch.  
Length, crankshaft bearings—Front, 2 1/2 inches; center, 2 1/2 inches; rear, 3 1/4 inches.  
Diameter connecting rod lower bearings, 1 5/8 inch.  
Length connecting rod lower bearings, 2 inches.  
Length connecting rods, 10 inches.  
Length pistons, 4 1/2 inches.  
Diameter flywheel, 14 15/16 inches.  
Weight, flywheel, 45 pounds.

In connection with the equipment the car is provided with a so-called one-man-top, which may be raised or lowered by one person. Demountable rims, carrying 32 by 3 1-2-inch tires are also used.



Left—Five-passenger Regal touring car for 1915. Note rain vision windshield. Right—Rear view of 1915 Regal touring car



PUBLISHED WEEKLY

Vol. XXX

Thursday, June 18, 1914

No. 25

## THE CLASS JOURNAL COMPANY

Horace M. Swetland, President  
 W. I. Ralph, Vice-President E. M. Corey, Treasurer  
 231-241 West 39th Street, New York City

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United States and Mexico ----- One Year, \$3.00  
 Other Countries in Postal Union, including Canada ----- One Year, 5.00  
 To Subscribers—Do not send money by ordinary mail. Remit by Draft,  
 Post-Office or Express Money Order, or Register your letter.

Entered at New York, N. Y., as second-class matter.

The Automobile is a consolidation of The Automobile (monthly) and the Motor  
 Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903,  
 and the Automobile Magazine (monthly), July, 1907.

## Safety First Brakes

**R**ECENTLY a motor car driven on the streets of New York City at a dangerous rate of speed struck and killed a woman, who was standing in the street waiting for a trolley car.

An examination of the car after the accident revealed the fact that the emergency brakes were entirely ineffective; with the brakes fully applied it was possible to readily push the car along the street.

Example No. 2: Recently a motor truck driven apparently recklessly on the streets of a large city fatally injured a small child, whom the driver acknowledged seeing for nearly 100 feet. Here, too, the brakes were not effective.

Neglect of the brakes is one of the most serious offences in driving a car, and if our private owners permit their chauffeurs to drive their machines without personally seeing to it that the brakes are in effective condition, they are not only endangering their own lives but the lives of others on the highways.

Such accidents as cited above are certain sooner or later to result in more drastic legislation covering motor cars. Police surveillance will increase, and if accidents of this nature continue it will not be surprising to hear of ordinances being passed giving officers of the law the right to stop a car at any time to have it tested as to the efficacy of both sets of brakes.

## Motor Truck Convention

**G**ETTING together is an evidence of civilization. Strides in human progress have largely been due to bringing varying factors together and operating them in concert.

Lack of team work has lost the international polo cup to America. Individual ability may shine resplendent as the noonday sun, but without team work the game is lost.

The motor truck business today requires team work.

The truck makers require to get together. They need to take a common look through the same field glass at the merchandising field. Many of our truck makers are individually strong enough to win out, to defeat the old-established horse, but they are paying more for what they accomplish than if they got team work from the entire truck industry.

Here is example No. 1, of what team work would blot out: Recently a certain truck maker sold a truck in Buffalo and the day delivery was made to the buyer. A salesman for a rival make of truck was on hand and actually induced the buyer to sell him the truck he had just bought and take one of his. The salesman succeeded. The buyer without ever using his first purchase a single mile, paid his money for it and then sold it to a rival truck maker who was able to get one of his trucks in its place.

This is not the kind of team work that builds up the truck business at the expense of the horse business. This is not merchandising. Internal rivalry of this type is one sure way of convincing the buyer that all kinds of trucks are in a more or less imperfect and unsatisfactory condition and that it is only a case of selecting the lesser of several evils when you purchase a motor truck.

It is to discourage all individual play (call it salesmanship if you so desire) of this kind and get real team work into the merchandising of motor trucks that a convention is needed. Salesmanship of this nature is most damaging. It is not productive of good repeat orders and is a sure course to price cutting and making the second-hand market worse.

Let us have team work to get rid of such damaging business transactions. Let the strong maker for a short time at least overlook his strength and take on his shoulders some of the burdens of the weaker brother. Let the stalwart play the rôle of educator, let him go to the convention not close mouthed, but open mouthed, ready to give to others some of his merchandising and manufacturing wisdom. For once practice the doctrine that "it is more blessed to give than to receive."

We must always remember the weaker element. This we have always with us, and it is not to be stamped out by damaging salesmanship, but rather to be encouraged into a stronger factor, developing the industry with its development.

The industry will profit from such team work. The strongest maker in the truck field will be benefited. His mind will be freed of many of the hallucinations that have been bothering him of late.



# High Rates for Compensation Insurance —Reductions for Good Plants

Rate Scheme Under New York Act Published—Automobile Makers to Pay \$1.10 Per \$100 of Payroll Unless Plants Are Entitled to Merit Concessions

NEW YORK CITY, June 15—The New York State Insurance Department has issued an official manual list of rates to be applied under the provisions of the workmen's compensation act. According to this list insurance will be costly to employers, the elimination of negligence as a defense making the premium high. The rates represent the cost per \$100 of payroll which the employers in this state will be required to pay after July 1 in indemnification of their workmen's compensation liability by the new law, and these are shown with the comparative costs to the employers of Massachusetts and New Jersey under their respective state laws. According to these tables, the insurance costs to New York employers will far exceed those in the nearby states.

The rates, however, may be lowered on merit, according to improvements in the physical condition of plants and properties, reducing respective risks or hazards from an insurance point of view.

Explaining a few of the insurance features, it may be said that an employer need not, unless he so prefers, insure the liability for medical benefits. According to an interpretation made by the Workmen's Compensation Commission, the insurance of medical benefits is not compulsory. A reduction of 20 per cent. in rates will be allowed on policies excluding medical benefits.

The rates are constructed upon the theory that at least 66 2-3 per cent. of the premium will go directly to the injured workman and his dependants, this percentage representing the actual amount which will be disbursed to claimants.

To employers who pay attention to accident prevention, whose plants have been inspected, and who will show a favorable record of accident experience, a reduction from the rates published will be allowed to the extent of 40 per cent., depending upon the physical conditions in the manufacturer's establishment and upon his record of accident experience.

The following table gives the official manual rates for workmen's compensation insurance to be charged by the stock and mutual companies in the automobile field. These rates are for each \$100 of payroll, and the comparison given with the rates prevailing in Massachusetts and New Jersey afford some idea of the difference in the benefits provided under the laws of the three states:

Classification	New N. Y. Comp. Rates Effective July 1	Mass. Comp. Rates	N. J. Comp. Rates
Acetylene gas tank charging stations.....	\$16.20	\$10.00	\$11.25
Additions to, alteration and repair of assured's existing buildings or plants.....	4.86	3.18	4.02
Aluminum smelting.....	2.66	1.75	1.98
Aluminum ware mfrs., from sheet aluminum.....	2.92	1.75	2.22
Asbestos Goods mfg.....	1.62	1.00	1.44
Autogenous cutting and welding, oxy-acetylene process, including shop.....	8.10	6.75	7.19
Automobile, carriage and wagon body mfrs.....	2.01	.65	1.20
Automobile chassis or frame mfrs.....	2.92	1.20	.84
Automobile dealers with or without garage and auto garages—electric.....	.97	1.23	....
Automobile dealers, with or without garage and auto garages—gasoline.....	1.36	1.50	....
Automobile engine mfrs.....	1.36	1.20	1.50
Automobile mfrs.—assembling of manufactured parts only.....	.91	.65	.66
Automobile mfrs.....	1.10	.65	.84
Automobile radiator mfg.....	1.30	.65	.80
shop.....	.30	.65	.41
Automobile salesrooms, no garage or repair.....	....	....	....
Axle mfrs. metal.....	2.01	1.00	1.50
Babbitt metal mfrs.....	1.36	.80	1.20
Battery mfrs.—storage, manufactured from lead plates.....	2.85	2.25	3.00
Carburetor mfrs.....	.97	1.10	1.26
Chain mfrs.....	2.72	1.50	1.68
Chauffeurs, commercial.....	2.43	....	....
Note—Chauffeurs operating private car type, private business purposes, \$15 for each chauffeur.	....	....	....
Clerical office employees, not in manufacturing plants.....	.05	.10	.11

Copper and zinc goods—mfrs.....	\$1.36	\$1.00	\$1.20
Cutting dies—mfrs.....	1.30	.60	.80
Gas or gasoline engine mfrs.....	2.07	1.20	1.50
Leather belting mfrs.....	.87	.65	.72
Metal goods mfrs. not otherwise classified..	5.67	3.38	4.37
Office buildings, payroll to include elevator attendants and all other employees engaged in care, custody and maintenance of premises.....	1.10	.85	.86
Clerical office employees.....	.05	.10	.11
Radiator mfrs.....	1.62	.75	1.20
Rubber tire mfrs.....	1.30	1.25	1.80
Tool mfrs., not otherwise classified, not mfg. machinery.....	.97	.50	.69

## Cole Adds a Little Six Model

INDIANAPOLIS, IND., June 12—Supplementing its larger six-cylinder model, which already has made a name for itself, and the new four-cylinder model announced within the past few weeks, the Cole Motor Car Co., Indianapolis, Ind., has added a little six model which resembles the larger six very closely and which sells for \$1,865. At the same time, the price of the big six, which was \$2,600, has been reduced to \$2,465.

The little six is new throughout, of course, and but one important alteration has been made in the big six. This concerns the gasoline feed which instead of being under air pressure now is by gravity; the new Stewart-Warner vacuum system is used in all of the Cole models. The little six model, like its larger brother, is steered from the left with the control levers in the center. Its motor has a unit power plant with the six cylinders in a block, the cylinder heads being in pairs and removable. The bore and stroke are 3.5 by 5-inch as against 4.25 by 5.25 for the bigger six. Delco lighting, starting and ignition is standard equipment. The wheelbase of the new model is 120 inches, as against 136. The tires are 4.5 inches in section. The essential elements of the transmission mechanism include a three-speed selective gearset and floating Timken axle.

The equipment included under the list price is Pantasote top with Cole curtains, Stewart speedometer, ventilating windshield, Delco electrical equipment, electric horn and a complete outfit of tools.

## Dodge Brothers Representatives Named

DETROIT, MICH., June 10—A. L. Philp, general sales manager of Dodge Bros., Detroit, has made the following appointments of district representatives: J. F. Roark, with headquarters in St. Louis, Mo., will look after the territory in and about St. Louis, Mississippi, Arkansas, Louisiana, western Tennessee and the southwestern part of Kentucky. Mr. Roark was formerly with the Cole Motor Car Co., and for the last 4 years Southern representative for the Oakland Motor Car Co. A. E. Houghton, with headquarters in Denver, to take care of the Denver district. Mr. Houghton has been during 3 years Western representative for the Marion-Overland Co., and later was one of the founders and half-owner of the Western Motor Car Co., Denver.

## Peerless Brings Out Four-Wheel Tractor

CLEVELAND, O., June 15—The use of trailers with its trucks has been recommended by the Peerless Motor Car Co., this city. Coincident with this the company announces a line of four-wheel tractors to be used in hauling trailers. One type hauls the trailers behind as with the standard truck and a small body is supplied to weight down the tractor either with live load or dead weight to secure the necessary traction. Another type carries one end of the trailer upon the tractor chassis.

# Prosperity in Australia—Trade Booming

## Low-Priced American Cars Doing a Tremendous Business— Farmers Buying in Large Quantities

**S**YDNEY, AUSTRALIA, May 12—Just now in Australia the conditions all over are simply booming; in fact, it is a record year of prosperity. Every ambitious farmer or land owner in the country is making money, and in the northern parts of New South Wales there are many small land owners who in previous years were making a mere living, but today they are fast becoming fairly independent, and it is with this class of small land owners that the automobile trade is doing its greatest business today.

These land owners cannot afford to pay for a high-priced car, but with the advent of the good light American low-priced car they are enabled to become automobilists; in fact, the progress is often compelling them to do so. While motor cars are made

light and economical, such as the few leading makes in the registration lists in Australia, business with these land owners will continue good.

The miniature car, or cyclecar, is meeting with success only in the city and chiefly among medical men. Outside of that it does not seem that they are going to be of any use whatever in the country districts, as the conditions of the roads in the country will not permit their being successfully used.

Business is progressing by leaps and bounds with at least three of the well-known low-priced American cars. One of these makes is selling three times the number of cars it did a year ago. In contrast to this some of the heavy American cars which did a good Australian business a year ago find their business greatly decreased this season.

## \$1,475 for Overland Seven-Passenger Six

**T**OLEDO, O., June 15—*Special Telegram*—Although the Willys-Overland Co. has been developing a six-cylinder car for some time in strict secrecy, it decided on June 13 to let the public into its confidence. Overland dealers all over the country were informed by wire that the factory would have ready for delivery early in the fall a seven-passenger, six-cylinder touring car which is to sell at the low figure of \$1,475.

Little of the actual constructional details of the new Overland, which is the first six-cylinder machine ever to be built by the big Toledo concern, are divulged at this time, however. The motor is rated at between 45 and 50 horsepower, according to the standard formula. It has already undergone considerable preliminary tests and is pronounced by Overland engineers to be exceedingly silent and smooth-running. The bore and stroke are withheld, but it is understood it is of the long-stroke type.

The wheelbase is 125 inches, which is sufficient to give a very roomy body, the lines of which are in accord with present ideas, in that the hood slopes to the cowl, which in turn rounds into the body proper. The radiator has a rounded edge, being a one-piece stamping, while fenders are also stamped out in domed form. Differing from many of the new cars, however, the Overland is equipped with side lamps. The car has a pleasing arrangement of the instruments on a cowl board above which there is a rain vision ventilating windshield. Drive is on the left and control in the center.

The new car is completely equipped in every respect. The regular model will carry electric lighting and cranking, while tires will be 35 by 4.5 inches all around and mounted on demountable rims.

It is pointed out that in offering the public a high-grade six which is to have in its construction the best materials the market affords, the Overland company is able to do so on account of the very large production facilities of its plants, in which practically every part of the car is to be manufactured. To take care of this machine, as well as its four-cylinder types, the concern is adding many acres of available floorspace. Additions to cost half a million are now under way.

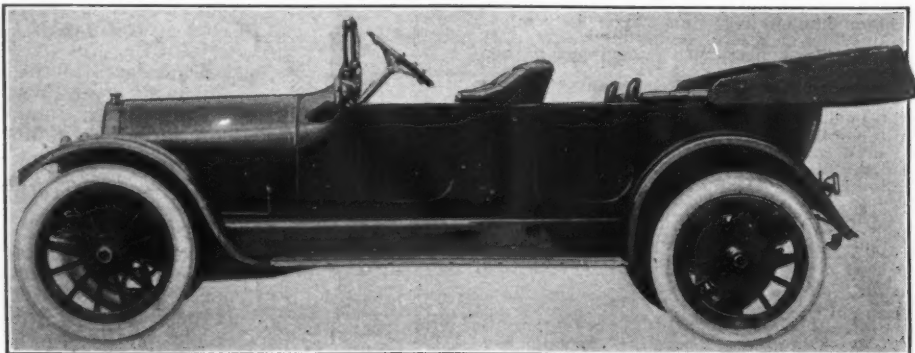
In entering the six-cylinder field, John N. Willys, head of the Willys-

Overland Co., points out that quantity production of fours will not be hampered, and that they will be made as strenuously as heretofore.

### New Waverley Has Ample Window Space

**I**NDIANAPOLIS, IND., June 13—The Waverley Co. of this city has announced its model 109 for the coming season. The changes will be found in the interior and exterior body design. The rear corners of the four-chair brougham have been rounded, greatly improving the appearance of the outside of the car. Another feature in increasing the beauty of the body design is the enlarged window space and the addition of oval corner windows. The lightness of the body structure has been increased by the use of sashless windows. The center of gravity of the car has been lowered by mounting the battery boxes lower.

The roof and panels of the body are aluminum and the entire assembly presents a harmonious design which is pleasing to the eye. The length of the car over all is 149 inches, the width 66 inches, wheelbase 106 inches, and clearance 10 inches. Pneumatic 34 by 4-inch tires are used in front and 34 by 4.5-inch tires in the rear. The springs are elliptic all around. The motor is an 80-volt Waverley, providing speeds of from 5 to 20 miles an hour. The car is equipped with a non-arcng controller, combination voltmeter and ammeter, shaft-driven trip and season odometer, two sets of brakes and left drive and control. The battery has 42 cells with eleven



New six-cylinder, seven-passenger Overland for \$1,475. It has a long-stroke motor



or thirteen plates. Any standard make of lead battery will be provided, or if Edison or Ironclad Exide are required they will be given at an extra charge.

#### An S. A. E. Section for Cleveland

CLEVELAND, O., June 12—Organization of Cleveland automobile designers into a branch of the American Society of Automobile Engineers is the aim of a committee appointed at a recent meeting of workmen interested. The committee includes W. R. Strickland, R. W. Nightingale, A. S. Scaife, Christian Gird and J. H. Hertner, all connected with Cleveland automobile manufactories.

There are nearly 100 designers in Cleveland's automobile industries, and the city is the geographical center for 800 members of the national association, it is maintained. By the organization of a branch it would facilitate matters and bring about better results, local members say.

#### L. R. Smith Heads Indiana S. A. E.

INDIANAPOLIS, IND., June 13—The Indiana section of the Society of Automobile Engineers has elected Lon R. Smith, manager of the Indianapolis sales branch of the Eisemann Magneto Co., president. Grover Grimes, secretary and treasurer of the Central Prest-O-Seal Co., has been elected secretary and treasurer of the section. The election took place at a meeting held at Crows Nest, the summer club house of the Hoosier Motor Club, near Indianapolis, on the evening of June 9.

#### Chandler Price Cut to \$1,595

CLEVELAND, O., June 12—The Chandler Motor Car Co., has made public the first details of the 1915 crop of Chandler cars. Although practically no alterations have been made in either the appearance or construction of the car, its price has been reduced from \$1,785 to \$1,595, a clear drop of \$190. Deliveries on the new models are now being made.

The car itself is a clean looking touring model with well blended lines. The cylinder dimensions are 3 3-8 by 5, giving an S. A. E. horsepower rating of 27.30. From the motor, power is transmitted through a multiple disk clutch and a three speed gear set, these two elements forming a unit with the motor. The wheelbase of the standard touring model is 120 inches and the wheels are shod with 34 by 4-inch tires. Equipment, of course, is complete and includes Westinghouse electric lighting system, Bosch ignition, Rayfield carburetor, top with side curtains, windshield and all of the various fittings which go to make a car complete. Left steer with center control is retained.

#### New Bowling Green Truck Has Worm Drive

NEW YORK CITY, June 11—The Bowling Green Motor Co., Bowling Green, Ohio, is putting out a new model worm-drive truck which, according to the company, has 20 per cent. more efficiency than the chain-driven truck.

The new model has complete Timken rear and front axles, Brown-Lipe-Chapin Gear Co. transmission, Continental motor, Bosch magneto and Pierce governor on the motor. This model is being made in ¾ and 1½-ton sizes.

#### New Wintons Have 136-Inch Wheelbase

NEW YORK CITY, June 12—The 1915 product of the Winton Motor Carriage Co., Cleveland, O., is now on the floor of the salesroom in this city. The most marked change in the car is the increase in the wheelbase. This is now 6 inches longer, making this dimension now 136 inches. The increase in wheelbase has been taken advantage of, with the result that the body lines have been lengthened out and there is more room in the tonneau than before. The same power plant is used, with the exception that the Rayfield carburetor is now used. The equipment has been elaborated upon and this year a one-man top, a compartment in the back of the front seat, an electric light lost-article-finder and a ventilating windshield are furnished as standard.

#### Studebaker Six Averages 15.3 Miles Per Gallon

BUFFALO, N. Y., June 14—The Studebaker Six, in the second of its five 200-mile tours, last Sunday, averaged 15.3 miles a gallon of gasoline. In connection with this, 2 quarts of oil and 3 quarts of water were used. The car carried six passengers. The run was through the foot hills of the Alleghenies, over the rough roads and hills on the southern boundary line of the state, the exact mileage being 206.7.

## Cyclecar Taxicabs Planned By \$500,000 Twombly Co.

Cars to Hold Three and Sell for \$600 with  
Selling Agreement Fixing 25-Cent  
Cost for First Mile

NEW YORK CITY, June 15—Hail the cyclecar taxicab! It will carry two passengers besides the driver, will sell for \$600 and will charge 25 cents for the first mile and 5 cents a quarter-mile thereafter. It is to be built by the Twombly Taxicab Co., which has been incorporated in New York state with a capitalization of \$500,000.

The enterprise is planned by W. Irving Twombly, New York, who is the builder of the Twombly cyclecar; he is vice-president and general manager of the new company. D. Stuart Dodge, of Phelps, Dodge & Co., New York, a copper concern, is president. The two men control this company as well as Twombly's cyclecar company.

A radical feature of the enterprise is a clause in the selling contract which provides that the cabs must be operated at not to exceed 25 cents for the first mile and 5 cents a quarter-mile thereafter. Twombly says that 1,000 already have been spoken for, for operation in New York, Boston and Philadelphia, and that this number will be turned out in the company's factory in Nutley, N. J., between October 1 and February 1. The first cabs will be completed within a few days. One at least has already been constructed.

As to the cab itself, it will have a 44-inch tread; 92-inch wheelbase; a four-cylinder water-cooled motor, 2¾ x 4; an improved landaulet body, and provision for carrying, Twombly says, as much baggage as the average taxicab.

#### Ford Moving Pictures to Boost Detroit

DETROIT, MICH., June 15—Detroit is to be better known to the 100,000,000 Americans. It will be by means of moving pictures and the films will be known as the Ford-Detroit Weekly. Henry Ford of the Ford Motor Co. has charged A. B. Jewett, to take the direction of the moving picture department which has been installed in the Ford park plant and which is going to keep a dozen men pretty busy. Besides showing the most important events of the week in the city, the movies will show interesting facts about the Ford plant. For instance, this week there will be shown pictures of last Saturday's Detroit-Philadelphia baseball game; the general hospital which Mr. Ford has taken under his management, the final assembly of cars in the Ford plant, the last process in turning out 1,000 cars daily, last week's children's outing, etc. It is reported that half a hundred picture houses have contracted for the Ford moving pictures which are to be shown all over the state, in Illinois, Indiana, Ohio and as far as the coast.

#### New York Electrical Society Discusses Cars

NEW YORK CITY, June 10—At the annual meeting of the New York Electrical Society held tonight, W. P. Kennedy delivered a lecture on "The Electric Vehicle in New York City." Mr. Kennedy, who has been prominent as a consulting traffic engineer in the local motor truck field for several years touched on the advantages and superiorities of the electric types of cars. The principal lines upon which central station men can most rationally aid in the introduction of electric vehicles was also discussed. He also touched upon the regularity, simplicity, fool proofness, economy, efficiency and other characteristic features of the vehicle.

#### Experts Address Motor Truck Club

NEW YORK CITY, June 17—The Motor Truck Club of America held its monthly meeting tonight at the Automobile Club of America. The speakers were Fire Commissioner Adams, F. E. Sampson, connected with the Exide Battery Co., and formerly with the Fifth Avenue Coach Co., A. F. Masury, in charge of the service station of the International Motors Co., A. J. Slade, a consulting engineer and G. A. Green, chief engineer of the Fifth Avenue Coach Co. A number of men prominent in the truck field also gave a general discussion on the subject. The papers of each of the speakers were illustrated by lantern slides.

## Syndicate Wants Pope Plant— An Offer of \$1,800,000 Made

**Bid Generally Approved—\$400,000 to Be Paid  
in Cash, Balance in Five-Year Notes  
—To Continue 2 Months**

BOSTON, MASS., June 13—According to plans now mapped out, Col. George Pope, receiver for the Pope Mfg. Co. in Connecticut, and who with Charles A. Persons and Charles A. Morse, is receiver in Massachusetts, the big plant will be sold to three men whose names are not to be disclosed unless the deal goes through. The courts in both Massachusetts and Connecticut are to be asked to sanction the deal. The hearing in relation to a receivership at Hartford, Conn., yesterday was postponed at the request of attorney Arthur L. Shipman, who is acting for the receivers.

The three men who have offered to purchase the property stand ready to pay \$1,800,000 for it. Of this amount \$400,000 is to be in cash, and the balance is to be in notes to run five years at 6 per cent. secured by a first mortgage. Under the terms of the offer, all of the notes will be taken up at the end of five years and the mortgage which will be given to secure the notes will be known as a mortgage of the "closed" class. That is the new owners cannot put a new additional mortgage on the property while the 5-year notes are outstanding.

Thus under the proposition Col. Pope will have \$400,000 cash on which to declare a dividend to creditors in a short time, and as the notes are taken up there will be additional dividends for them. One of the attorneys familiar with the situation stated that the acceptance of the offer means that the creditors of the company will be practically paid in full, though there will be nothing for the stockholders.

The plan is to organize a new corporation, and if stockholders in the present corporation want to subscribe for stock in the new company they may have that right. Under the plan a preferred stockholder of the old company holding

eight shares of stock may subscribe for one share in the new corporation. Each subscriber will be given one share of common stock. Holders of common stock in the old corporation have the right to subscribe for preferred stock of the new company on a basis of one share for each 12 shares held in the old company, and such subscribers will be given half a share of common stock.

Under the plans now arranged there will be a hearing at Hartford on June 24, Judge Bennett having set that date for it. On the following day there is to be a hearing at Boston in the United States district court. All of the creditors will be given notice of these hearings, and it is said that favorable action is expected. About the only thing that might prevent its going through would be some one making a better offer, but this seems unlikely now. Edward E. Blodgett of Boston, representing more than two-thirds of the total claims against the Pope Mfg. Co., attended the hearing at Hartford yesterday, and when he heard of the offer he stated that it sounded very good to him. He said the bank and note creditors felt the same way, and he had no doubt but what it would be accepted.

### Acceptance of Offer Expected

One of the conditions of the offer is that the majority of the directors of the new corporation taking over the property shall be satisfactory to the holders of the notes during the life of the notes. If the offer is accepted it is expected that the company will start running on full time again. In order that everything may work out smoothly Judge Bennett yesterday made an order that Colonel Pope continue the business for 2 months from June 20 so that on the acceptance of the offer the purchasers can take the plant over as a going concern. Mr. Blodgett returned to Boston to confer with the creditors he represented, and he stated that as there will be a cash fund of \$400,000 practically at once, and the mortgage will secure the property to the creditors, it means that they will have both anyway, while now they have only the property, so the acceptance of the offer seems a foregone conclusion.

### Krit Co. Prosperous—Cancels 1-5 of Debts

DETROIT, MICH., June 13—The Krit Motor Car Co., of Detroit, has just made a new payment of 20 per cent. on its outstanding indebtedness, which, together with a 10 per cent. payment in February, makes a total of 30 per cent. paid up in 4 months. Krit officials are enthusiastic and say that business has been 25 to 30 per cent. better thus far this year as compared with the corresponding period last year. Although there is a general business depression it does not seem to have affected the Krit business, as dealers throughout the country have been asking for more cars than could possibly be made. The business in the West during the summer has been splendid, and much better than during the spring when it rained too often. The crops in Kansas and Oklahoma are very good this summer and a big business is anticipated in those states. The foreign end of the Krit business has been steadily increasing, especially in South Africa, Australia, New Zealand, South America. This is principally due to the equipment of the cars with wire wheels which are demanded in those countries.

### Market Reports for the Week

The usual changes occurred in this week's markets, the most important of them being that of tin which went down \$1.02 per 100 pounds. There was a demand for small lots of tin for early shipment, with small interest in future positions. Electrolytic copper was dull and weaker in Europe on Tuesday. In the local market electrolytic was quotable between \$0.13 3-4 and \$0.13 4-5 a pound, delivered in 30 days, but there was very little demand from domestic consumers and scarcely enough business to test the market. Lead was dull but steady at \$3.90 per 100 pounds. Cottonseed oil trading was only moderate in volume last week and prices were barely steady. Demand is indifferent, and as a result the price has gone down to \$7.25 a barrel at a loss of \$0.09.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Changes
Antimony	.05 3/4	.05 3/4	.05 3/4	.05 3/4	.05 3/4	.05 3/4	.....
Beams & Channels, 100 lbs.	1.26	1.26	1.26	1.26	1.26	1.26	.....
Bessemer Steel, ton	19.50	19.50	19.50	19.50	19.50	19.50	.....
Copper, Elec., lb.	.14	.13 3/4	.13 3/4	.13 3/4	.13 3/4	.13 3/4	-.00 1/4
Copper, Lake, lb.	.14 1/4	.14	.14	.14	.14	.13 3/4	-.00 3/4
Cottonseed Oil, bbl.	7.34	7.38	7.41	7.38	7.37	7.25	-.09
Cyanide Potash, lb.	.17	.17	.17	.17	.17	.17	.....
Fish Oil, Menhaden, Brown	.40	.40	.40	.40	.40	.40	.....
Gasoline, Auto, gal.	.14	.14	.14	.14	.14	.14	.....
Lard Oil, prime	.93	.93	.93	.93	.93	.93	.....
Lead, 100 lbs.	3.90	3.90	3.90	3.90	3.90	3.90	.....
Linseed Oil	.54	.54	.54	.54	.54	.54	.....
Open-Hearth Steel, ton	19.50	19.50	19.50	19.50	19.50	19.50	.....
Petroleum, bbl., Kans. crude	.75	.75	.75	.75	.75	.75	.....
Petroleum, bbl., Pa. crude	1.80	1.80	1.80	1.80	1.80	1.75	-.05
Rapeseed Oil, refined	.59	.59	.59	.59	.59	.59	.....
Rubber, Fine Up- River, Para.	.70 1/2	.70 1/2	.70 1/2	.70	.70	.70	-.00 1/2
Silk, raw, Ital.	5.10	5.10	5.10	5.10	5.10	5.00	-.10
Silk, raw, Japan	4.40	4.40	4.40	4.40	4.32 1/2	4.35	-.05
Sulphuric Acid, 60 Baume.	.90	.90	.90	.90	.90	.90	.....
Tin, 100 lb.	31.15	31.15	30.85	30.80	30.00	30.13	-1.02
Tire scrap	.04 3/4	.04 3/4	.04 3/4	.04 3/4	.04 3/4	.04 3/4	.....

### War Dept. Truck Contracts Approved

WASHINGTON, D. C., June 17—Special Telegram—Secretary of War has approved contracts for furnishing army with twenty motor trucks based on bids opened several weeks ago. The contracts were divided as follows: White, four; Kelly-Springfield, Driggs-Seabury, Lord Baltimore, Federal, one each; Jeffery, two; Velie, five; Lippard-Stewart, three; and Mack, two. Division of the contract will furnish the army with various types of trucks so that it will be possible to conduct comparative tests and determine which of the trucks satisfactorily fulfills the conditions of actual service in the field.

### Charles Singer Buys Palmer-Singer Assets

NEW YORK CITY, June 15—The Palmer-Singer car has ceased to be a factor in the motor car industry, William Wooster, a New York supplyman, having changed his mind about building a less-than-\$500 car under the Palmer-Singer name, resold the assets which he had purchased at the receiver's sale and gave up the enterprise.

The name, patents, good-will and parts in stock were purchased at Wooster's sale by the Singer Motor Co., which was recently formed by Charles A. Singer, Sr., to make and market the Singer car, which is now nearing readiness for the market. The Singer Motor Co. has established itself in the



old Alco building at 630 Jackson avenue, Long Island City, and will supply Palmer-Singer parts. The stock purchased by the Singer Motor Co. is quite extensive and as it runs out other parts will be manufactured.

The purchase of the name, patents and good-will by Singer, Sr., brings the name back into the hands of one of the original owners, he having been the head of the Palmer & Singer Mfg. Co. The machinery and other materials bought by Wooster were sold in parcels to about 100 bidders and it is stated that there is no probability of operations being resumed in the old Palmer & Singer plant. The building was a leased property.

### Detroit May Car Exports, \$1,077,884

DETROIT, MICH., June 14—The total value of all the goods exported through the port of Detroit in May, 1914, was \$4,732,456. Twenty-two per cent. of this total, or \$1,077,884, represents the automobile export business. As the total value of the motor cars exported in May, 1913, was \$862,535, this year's total shows an increase of \$215,349, or 20 per cent. This is the more remarkable considering the general depression in the business which is best shown in the fact that Detroit's total export business in May of this year is \$759,010 below the total of May, 1913.

### Trucks Lower English Living Costs

NEW YORK CITY, June 12—Because high food prices are mainly responsible for labor agitation, the problem of increasing home supplies of food will engage the attention of the British government, said the president of the National Cham-

ber of Trade in England in his address at its sixteenth annual conference in Blackpool recently. He referred to the growth of motor traction as promising cheaper food.

### Kelly Accumulated Tire Dividend Payable

NEW YORK CITY, June 17—The board of directors of the Kelly-Springfield Tire Co. has authorized the Bankers Trust Co. to exchange the debenture bonds of the company for 6 per cent. cumulative preferred stock on the basis of one share of par value preferred stock for each \$100 face value of the bonds, pursuant to the refinancing plan recently adopted. The directors have taken this action following the deposit of over 90 per cent. of the 50-year 4 per cent. income debenture bonds with the trust company. It is also announced that the 78 1-2 per cent. accumulated dividends on the \$1,149,500, 6 per cent. cumulative preferred stock, declared on April 9, 1914, payable at a date to be thereafter fixed, is now due and payable.

### Coffin for Road Maintenance Tax

DETROIT, MICH., June 16—"Sooner or later all vehicles, both horse and motor driven, must be taxed for road maintenance," says Howard E. Coffin, vice-president of the Hudson Motor Car Co., who recognizes neglect of the highways as a serious offset to the large outlays for new roads that are constantly being made throughout the country. "Appropriations for road building are being made generally," he added, "but little attention is being paid to financing a proper road maintenance year after year."

## Automobile Securities Quotations

NEW YORK CITY, June 17—The apathetic conditions which characterized the stock market in general during the past week applied to the automobile securities as well, there being no changes of any great significance or importance. The 5 1-8 points gain registered by the Case company is due to the increased demands for threshing machinery, owing to the tremendous crops to be harvested this year. Chalmers

Motor preferred shows a gain of 2 1-2 points due to reports of good business and large sales. Goodrich preferred and Goodyear common showed gains of 2 points each as well as Reo Motor Car Co. Miller rubber climbed 11 points and the Swinehart, 15. The only news on these changes being reports of better business. Several of the stocks showed slight declines in values due to the inactive market.

Security	Wednesday Bid Asked	Thursday Bid Asked	Friday Bid Asked	Saturday Bid Asked	Monday Bid Asked	Tuesday Bid Asked	Week's Change	1913 Bid Asked
Ajax-Grieb Rubber Co. com.	220 ..	220 ..	200 ..	200 ..	220 ..	220 ..	..	150 ..
Ajax-Grieb Rubber Co. pfd.	99 ..	99 ..	99 ..	99 ..	99 ..	99 ..	..	95 100
Aluminum Castings pfd.	98 ..	98 ..	98 ..	98 ..	98 ..	98 ..	..	97 100
Case T. M. Co., J. I.	85 ..	87 1/2 ..	90 ..	90 ..	95 ..	95 ..	+5 1/2	.. ..
Chalmers Motor Co. com.	98 ..	102 ..	98 ..	102 ..	98 ..	102 ..	..	128 135
Chalmers Motor Co. pfd.	94 ..	96 ..	94 ..	96 ..	94 ..	96 ..	+2 1/2	98 102
Electric Storage Battery Co.	52 1/2 ..	53 ..	52 1/2 ..	52 ..	52 1/2 ..	52 ..	-1	.. ..
Firestone Tire & Rubber Co. com.	305 ..	310 ..	305 ..	310 ..	305 ..	305 ..	-5	228 232
Firestone Tire & Rubber Co. pfd.	108 ..	110 ..	108 ..	110 ..	108 ..	109 1/2 ..	..	104 106
Garford Co. pfd.	75 ..	85 ..	75 ..	85 ..	75 ..	85 ..	..	85 95
General Motors Co. com.	93 ..	94 ..	92 1/2 ..	95 ..	91 1/2 ..	92 ..	-2 1/2	26 30
General Motors Co. pfd.	93 1/2 ..	95 1/2 ..	93 ..	95 ..	93 ..	95 ..	-1 1/2	72 75
B. F. Goodrich Co. com.	24 1/2 ..	25 ..	24 1/2 ..	25 ..	24 1/2 ..	25 1/2 ..	+3 1/2	26 1/2 28 1/2
B. F. Goodrich Co. pfd.	88 1/2 ..	90 ..	89 ..	90 1/2 ..	90 ..	91 ..	+2	90 94
Goodyear Tire & Rubber Co. com.	170 ..	175 ..	170 ..	175 ..	170 ..	172 ..	+2	285 295
Goodyear Tire & Rubber Co. pfd.	97 1/2 ..	99 ..	97 1/2 ..	99 ..	97 1/2 ..	99 ..	..	98 99 1/2
Gray & Davis Co. pfd.	95 ..	102 1/2 ..	95 ..	102 1/2 ..	95 ..	102 1/2 ..	..	.. ..
International Motor Co. com.	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	..	4 6
International Motor Co. pfd.	3 ..	10 ..	3 ..	10 ..	3 ..	10 ..	..	10 15
Kelly-Springfield Tire Co. com.	62 ..	64 ..	62 ..	63 ..	60 ..	62 ..	-2	.. ..
Kelly-Springfield Tire Co. pfd.	140 ..	150 ..	140 ..	150 ..	135 ..	145 ..	-5	.. ..
Lozier Motor Co. com.	.. ..	23 1/2 ..	.. ..	23 1/2 ..	.. ..	21 1/2 ..	..	15 20
Lozier Motor Co. pfd.	30 ..	43 ..	30 ..	43 ..	30 ..	43 ..	..	.. 92
Maxwell Motor Co. com.	14 1/2 ..	15 ..	14 1/2 ..	14 1/2 ..	15 1/2 ..	14 1/2 ..	+ 3/4	3 4
Maxwell Motor Co. 1st pfd.	44 ..	45 1/2 ..	44 ..	45 ..	44 ..	45 ..	-1	30 33
Maxwell Motor Co. 2d pfd.	18 1/2 ..	19 ..	18 1/2 ..	19 ..	18 1/2 ..	19 ..	- 1/2	9 12
Miller Rubber Co.	128 ..	135 ..	128 ..	135 ..	128 ..	139 ..	+11	.. 140
New Departure Mfg. Co. com.	123 ..	125 ..	123 ..	125 ..	123 ..	125 ..	+2	.. ..
New Departure Mfg. Co. pfd.	105 ..	107 ..	105 ..	107 ..	105 ..	107 ..	+1	.. ..
Packard Motor Co. com.	103 ..	103 ..	103 ..	103 ..	103 ..	103 ..	..	.. ..
Packard Motor Co. pfd.	97 ..	100 1/2 ..	97 ..	100 1/2 ..	97 ..	100 ..	..	.. ..
Peerless Motor Co. com.	18 ..	25 ..	18 ..	25 ..	18 ..	25 ..	..	40 50
Peerless Motor Co. pfd.	.. ..	62 1/2 ..	.. ..	62 1/2 ..	.. ..	62 1/2 ..	..	.. 96
Pope Mfg. Co. com.	.. ..	1 1/2 ..	.. ..	1 1/2 ..	.. ..	1 ..	..	10 13
Pope Mfg. Co. pfd.	.. ..	8 ..	.. ..	8 ..	.. ..	3 ..	..	40 43
Portage Rubber Co. com.	.. ..	40 ..	.. ..	40 ..	.. ..	40 ..	..	.. 40
Portage Rubber Co. pfd.	.. ..	90 ..	.. ..	90 ..	.. ..	90 ..	..	.. 90
*Reo Motor Truck Co.	9 1/2 ..	10 ..	9 1/2 ..	10 ..	9 1/2 ..	10 1/2 ..	+ 1/2	.. 11 1/2
*Reo Motor Car Co.	18 ..	20 ..	18 ..	20 ..	18 ..	20 ..	+2	.. 20 1/2
Rubber Goods Mfg. Co. pfd.	100 ..	110 ..	100 ..	110 ..	100 ..	110 ..	..	.. ..
Russell Motor Co. com.	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	..	.. ..
Russell Motor Co. pfd.	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	..	.. ..
Splitdorf Electric Co. pfd.	.. ..	50 ..	.. ..	50 ..	.. ..	50 ..	..	.. ..
Stewart Warner Speedometer Corp. com.	47 ..	48 1/2 ..	47 ..	48 1/2 ..	47 ..	49 ..	..	.. ..
Stewart Warner Speedometer Corp. pfd.	97 1/2 ..	99 1/2 ..	97 1/2 ..	99 1/2 ..	97 ..	99 ..	- 1/2	.. ..
Studebaker Co. com.	33 1/2 ..	34 ..	33 1/2 ..	33 1/2 ..	33 ..	33 1/2 ..	-1 1/2	22 24 1/2
Studebaker Co. pfd.	87 1/2 ..	88 1/2 ..	87 ..	87 1/2 ..	87 ..	87 ..	-2 1/2	82 85
Swinehart Tire & Rubber Co.	70 ..	80 ..	70 ..	80 ..	70 ..	85 ..	+15	84 86
Texas Company	146 1/2 ..	147 1/2 ..	147 ..	146 1/2 ..	147 ..	146 ..	- 1/2	.. ..
U. S. Rubber Co. com.	59 ..	59 1/2 ..	58 1/2 ..	59 ..	58 1/2 ..	59 ..	..	56 1/2 58
U. S. Rubber Co. 1st pfd.	103 ..	104 ..	102 ..	104 ..	102 1/2 ..	104 ..	+ 3/4	100 102
Vacuum Oil Co.	225 ..	229 ..	223 ..	226 ..	224 ..	228 ..	-3	.. ..
White Co. pfd.	107 ..	110 ..	107 ..	110 ..	107 ..	110 ..	..	102 104
Willis-Overland Co. com.	77 ..	80 ..	78 ..	79 ..	79 ..	80 ..	-1 1/2	53 60
Willis-Overland Co. pfd.	92 ..	95 ..	94 ..	95 ..	93 ..	95 ..	..	80 90

\*The par value of these stocks is \$10; all others \$100.

## Newtone Dealers Released from Klaxon Horn Injunctions

Automobile Supply Mfg. Co.,  
with \$150,000 Stock on Hand,  
Can Now Market Freely

NEW YORK CITY, June 15.—Seven supply house dealers in New York City and seven others in as many other different cities against whom the Lovell-McConnell Mfg. Co. had secured injunctions against prohibiting them from selling Newtone horns have had these injunctions suspended by a court order upon the filing of an affidavit by the legal representative of the Automobile Supply Mfg. Co., maker of the Newtone horn. These dealers are now free to go ahead with the marketing of these horns.

The seven New York dealers are: American Auto Supply Co.; Charles E. Miller; Max Zeisler, doing business as the Automobile Supply Co.; the 35 Per Cent. Automobile Supply Co.; the Crane & Wagner Co.; the National Auto Supply Co., and the New York Auto Supply Co.

The Automobile Supply Mfg. Co., at its Brooklyn factory, has now on hand over \$150,000 worth of horns which were made up before the decision restraining them from doing business was enforced, and the factory has already started the marketing of these through its regular line of dealers.

On Friday, June 12, the legal representatives of the Automobile Supply Mfg. Co. appeared before Judge Cox, who signed an order to the lower court, directing that the bill be dismissed, and thus leaving the Automobile Supply Mfg. Co. free to carry on its business.

In our June 11 issue it was stated that the Automobile Supply Mfg. Co. was charged with the costs of the suit brought against it by the Lovell-McConnell Mfg. Co. and which was won by the Automobile Supply Mfg. Co. The court ordered that the Lovell-McConnell company pay the costs of the suit.

### Imperial Sues Milwaukee Motor for \$331,712

MILWAUKEE, WIS., June 17.—The Imperial Automobile Co., Jackson, Mich., brought suit June 8 in federal court at Milwaukee against the Milwaukee Motor Co., bankrupt, for \$331,711.93, claimed as damages resulting from the failure of the bankrupt to make deliveries of motors as agreed. The action is brought in the bankruptcy division of the federal court because the Milwaukee Motor Co.'s bankruptcy matter is still pending. Most of the assets have been sold and the plant is not being operated by the purchasers.

The Imperial claim, filed by Theodore A. Campbell, treasurer, sets forth that the Milwaukee company failed to deliver as contracted for:

- (a) 500 model A motors, at the rate of fifty each month from August, 1912, to May, 1913.
- (b) 500 model 18-A motors, to be shipped at the rate of fifty per month, from August, 1912, to May, 1913.

(c) 200 model S six-cylinder motors, to be shipped from September, 1912, to April, 1913.

(d) 1000 model F motors, to be shipped from September, 1912, to February, 1913.

(e) 250 model 18-A motors, to be shipped under an agreement made February 24, 1913.

The Imperial claims none of the motors were delivered according to the agreement, and 975 were never delivered, the company having gone into the hands of a receiver.

The Imperial company alleges that by reason of default on the part of the Milwaukee concern, that it lost the sale of (1) 400 of its model 32 cars, which would have netted a profit of \$92.52 each, the sale price being \$900; (2) thirty-nine of its model 34 cars at \$1,155, which would have netted a profit of \$123.30 each; (3) 336 of its model 44 cars, at \$1,312.50, with profit of \$222.07; (4) 200 model S cars, which would have brought a profit of \$195.00 each.

Further, the Imperial claims that in addition to the loss of profits, it has left on its hands parts of cars in various stages of completion which it has been unable to sell, and in which claimant has invested no less than \$306,236.16.

Further, because claimant was unable to get motors elsewhere of the same pattern as those contracted for, it was forced to take others of different types, entailing a loss of \$82,719.79, which was additional expense due to cost of adjusting, etc. Also, the cars so equipped were not up-to-date and had to be sold at less than cost, entailing a loss of \$36,583.

The sum of \$26,512.38 is claimed on account of various parts in the hands of claimant which it was unable to use in the season of 1912 and 1913, and which parts are now obsolete.

The sum of \$61,872.23 is claimed for loss in factory operation due to delay and failure to deliver motors.

The sum of \$8,500 is claimed on account of defective motors which required repairs and rebuilding.

### 2 Weeks More for N. Y. Separator Tests

NEW YORK CITY, June 15.—A further truce of 2 weeks has been declared in the gasoline separator war between the City of New York and the dealers and garagemen. The garagemen and the Municipal Explosives Commission which will conduct the prosecutions under the ordinance, were to have presented their cases before the Welfare Committee of the Board of Aldermen last Friday, June 12, but the illness of the garagemen's chemist caused a postponement to Friday, June 26, at 2 p. m. Tests are being made by both sides together and separately and the garagemen, on the results obtained, have hopes of securing the repeal of the ordinance.

### Longuemare Must Answer Stromberg by June 20

NEW YORK CITY, June 15.—An order has been signed in the case of the Stromberg Motor Devices Co. against Ludwig Arson and Alfred Michaelas, trading under the name of the Longuemare Carburetor Co., postponing the hearing of the case to Friday, June 26, and ordering that the defendants serve and file answering affidavits on or before June 20.

### Prest-O-Lite Co. Enjoins Two Tank Fillers

DETROIT, MICH., June 16.—The Prest-O-Lite Co. today secured preliminary injunctions against Leo E. Mann and S. M. Sturgis to prevent them from re-filling Prest-O-Lite tanks.

## Dealers, as Agents for Motor Underwriters, Can Insure Against Theft, Damage or Liability

NEW YORK CITY, June 16.—Insurance has now been added as a department of the automobile industry. It is, or soon will be, possible for the man who buys a car to buy insurance of the dealer and to secure any adjustment as to repair through the manufacturer or dealer without going outside the automobile industry.

This has been made possible through the Manufacturers' and Dealers' Motor Underwriters, Inc., 80 Maiden Lane, New York City, which has entered the field with fire, theft, liability, property damage and collision insurance.

This company, which has been organized recently by men prominent in the motor car manufacturing trade, is a general agency corporation specializing in motor-car insurance, and already branch offices have been established in Chicago, Buffalo, Rochester, Detroit, Cleveland, Indianapolis, Washington, D. C., and Nashville, Tenn. The establishment of similar branches is being rapidly pushed in a dozen other cities.

The Manufacturers' and Dealers' Motor Underwriters, Inc., is incorporated under the laws of the State of New York, and acts as managing agent for the United States for the motor-car department of the Fidelity Underwriters, comprising the Continental Insurance Co. and the Fidelity-Phenix Fire Insurance Co., and also is managing agent for the motor-car department of the United States Casualty Company.

The officers of the Manufacturers' and Dealers' Motor Underwriters, Inc., are: President, William E. Metzger; vice-president, Ernest H. Greenwood; treasurer, Ballard McCall; manager of the metropolitan department, H. A. Bonnell.

The directors are A. G. Batchelder, chairman of the executive committee of the American Automobile Association; Hugh Chalmers, president of the Chalmers Motor Car Co.; Roy D. Chapin, president of the Hudson Motor Car Co.; W. J. Foss, treasurer of the Foss-Hughes Co., Philadelphia; Ernest



H. Greenwood; William B. Joyce, president of the National Surety Co.; William W. Metzger, director of the National Automobile Chamber of Commerce; S. A. Miles, formerly general manager of the National Automobile Chamber of Commerce; H. H. Rice, vice-president and general manager of the Waverley Co., and John N. Willys, president of the Willys-Overland Co.

In addition to the board of directors, the company has an advisory board, made up of such men as Thomas Henderson, vice-president of the Winton Motor Car Co.; R. E. Olds, president of the Olds Motor Works; Chester I. Campbell, secretary of the Boston Automobile Association; John W. Bates, vice-president and general manager of the Mitchell-Lewis Co., and many others. The company has also connected with its home office several expert underwriters.

The company plans to bring the maker, dealer and owner closely together, and its policy is unusual in that the owner who meets with an accident far from home need not be put to any delay in having his car repaired; he may go to the nearest dealer in the car he is driving, have the necessary repairs made, and the dealer and the insurance company will attend to the matter in its further detail.

The practical working of this plan of making adjustments is best described by giving an incident of an actual loss.

#### System Accelerates Repair Work

Through the New York office of the Manufacturers' and Dealers' Motor Underwriters, a Peerless limousine sold by the Peerless dealer in New York was insured. At half-past 5 one afternoon the Manufacturers' and Dealers' Motor Underwriters were notified that the car had been severely damaged by collision in Boston. The Underwriters immediately got the Peerless Motor Car Co. of Boston on the telephone, instructed them to get the car and immediately repair it, handing it back to the insured at the earliest possible moment without waiting for an inspector from their office.

The repair work was started immediately and practically completed within 24 hours. The ordinary method of making an adjustment of this kind would have been to send an inspector to view the damaged car and then secure bids from half a dozen repairmen, giving the repair job to the lowest bidder. This probably would have resulted in unsatisfactory repairs, and the owner would have been out of the use of his car for a week or more. In this case the inspector did not get an opportunity to view the car until the repair work was nearly completed. The assured, however, was given the service for which he had paid.

The Manufacturers' and Dealers' Motor Underwriters is encouraging dealers everywhere to take out brokers' licenses which will give them the necessary authority from the Department of Insurance to act as insurance brokers and receive a commission therefrom. The underwriters claim that the motor car dealer is better fitted to assist motor car owners in getting good insurance than the average insurance agent or broker; certainly he is the best equipped to make adjustments.

The Underwriters give the dealer every assistance in their power to secure brokers' licenses, and, once they have secured the broker's license, they are in a position to interest their customers in car insurance at the time of the sale of the car; in fact, he has the first opportunity to suggest motor-car insurance to the customer.

#### Important Service to Owner

By offering the car buyer the insurance furnished by the motor underwriters he is rendering him a distinct service, for he is calling to the customer's attention the special policies of motor-car insurance which provide that he may have it repaired by the manufacturer who made it or his duly authorized representative in the event of loss. This eliminates any delay, which has been one of the bugbears of accident insurance.

Under this plan, should a man buy a Cadillac in New York City he can obtain insurance through a Cadillac dealer if that dealer has a broker's license; then, were he touring in Indianapolis and damaged his car, he could go to the Cadillac dealer in Indianapolis and have the car repaired without delay. Then the Cadillac dealer in Indianapolis would take the matter up with the insurance company and arrange for settlement of the bill. By the time the bill is settled the car owner is miles on his way.

The effort on the part of the dealer in selling insurance is not great, in that it is but an after part of the sale; and the remuneration is not negligible, for he gets the brokerage commission on the total premium. This gives the dealer who has become an insurance broker the opportunity to add to his

income without any additional investment of money and with but very little additional investment of time. At the same time he is rendering his customer a most distinct service.

Insurance has always been mystifying to the man who has not made a study of it, and because of this fact the company has mapped out a plan whereby it will be a simple matter for the dealer to quote rates; in fact, all he requires is to be able to read English.

Under the regular insurance plan of quoting rates, agents in making the quotation must first consult what is known as the Manual. He must look through this manual for the particular make and model of car which he proposes to insure and obtain what is known as the "insurable horsepower" which is estimated on a formula known as the National Automobile Chamber of Commerce formula. Having obtained the insurable horsepower, he must consult the pamphlet of rates governing the rates in the particular territory where the car to be insured is located.

This will give him the rates for liability and for property damage insurance for that particular horsepower. Having secured these rates he must again turn to the Manual and find the classification of that particular model and make of car for property damage insurance—this is given in the form of a letter of the alphabet—return to his pamphlet and find out what the rates are on class A, B, C, D, etc.

The Manufacturers' and Dealers' Motor Underwriters has greatly improved on this plan—it is publishing separate sheets of rates on each particular make of car; sheets, for instance, give a column in which all models of the Cadillac car are described; immediately following the model is a column giving the list price; following that is a column giving the insurable horsepower; following that the insurance rate on those particular models are given in dollars and cents.

The dealer-insurance man does not have to figure; all he needs to do is to look opposite the model he has sold and there is the premium. The fire and theft premiums are figured on simple percentages.

Not only that, but the technical insurance terms are made plain; they are translated into every-day English in the same folder which explains the premium so simply. Liability insurance, property damage and collision are explained; "deductible average" is about as profound an expression as is encountered, but the folder explains it by stating that "\$25 deductible average" provided that \$25 shall be deducted from each claim and insurance granted shall be for loss or damage in excess of that amount only. Policies are issued with or without the deductible average. Intricacies of rates and nomenclature are similarly uncovered.

#### Co-operative Work by Managers

In addition to making the work of interesting owners in insurance easy, the company will do everything in its power to assist the dealer to secure the necessary certificate of authority from his state to do business; much of the co-operative work will be done through resident managers, to each of whom will be assigned a certain territory.

In the settlement of claims there are several provisions. The car owner has first choice and may have the repairs made by the company which made the car or by its duly authorized representative, which, of course, means the dealer. If the owner leaves it to the insurance company to put the car in shape, the company may handle the repairs as it sees fit, or a settlement may be made in cash. In any event, it is planned to eliminate the shopping from repairman to repairman which often is done by insurance adjusters, with the result in so many cases that the repairs are unsatisfactorily made by a repairman who is not so familiar with the car as is the dealer who sold it.

It is anticipated that very few dealers will have any difficulty in securing broker's licenses from the Department of Insurance in the state where they are operated.

"Reputable" is the keyword to the situation. Any dealer who is representing a manufacturer should be reputable, say the insurance people. Therefore, it would seem that practically every dealer should be able to get a broker's license. If he does so, and co-operates with the Manufacturers' and Dealers' Motor Underwriters, and should overcharge on a repair job or conspire with his customer to do a certain amount of work on the car, to which the customer is not entitled under his policy, and charge it to the insurance company, or do anything which takes him out of the reputable class, he will speedily be weeded out.

Rate sheets are being prepared for each different car manufactured; if a man handles the Packard and Chalmers he will be supplied with rate sheets for all models of those cars, but will not require rates for any other cars. The Manufacturers' and Dealers' Motor Underwriters had practically all of these rate sheets prepared some time ago, then came the change in rates on liability, property damage and collision and the work had to be done all over again. These rate sheets will be ready in the immediate future.

## Chicago's Headlight Ordinance Now Being Enforced

Tests of Non-Glare Devices  
Made by Special Board—  
Boulevards Not in Jurisdiction

CHICAGO, June 15—The city of Chicago today begins enforcement of the headlight ordinance which came into effect March 30. According to the provisions of this ordinance no motor vehicles are permitted on the city streets with dazzling or glaring lights. By the ordinance, a board of motor vehicle headlight inspection was organized to determine definitely what devices and what arrangements of headlights could be permitted as non-glaring.

Lights or devices submitted by manufacturers for test are tested first under dark room conditions in a special laboratory at the City Hall. This test is for dazzling or glaring effect alone. Those lights or devices tentatively approved at this test are then tested at night under road conditions. In all twenty-five manufacturers, dealers and inventors, furnished from one to four devices each for test. Twelve lights, or dimming devices, have been approved as complying with the ordinance, and others are being held subject to further adjustment.

It has been aimed by the board to approve, after a fair test, as many lights and devices as reasonably comply with the ordinance, and whenever it has concluded that a rejected device could be changed so as to comply, it has suggested such changes and offered re-inspection.

### Ordinances Not Enforced in Parks

So far as the conditions hold at present, the ordinance will be enforced only on the streets under the jurisdiction of the city police. The park systems and the boulevards are under the police of the different park boards, and so far no definite arrangement has been made toward the application of the non-glaring regulation by the park boards. It is understood, however, that informal assurances have been given the city police by the park boards that the latter will co-operate in enforcing the ordinance.

Whenever a device has been approved by the Board of Headlight Inspection, a certificate of the inspection is issued stating that the same complies with the provision of the ordinance, and a definite description of the device is incorporated stating the exact conditions under which it is approved. Copies of these certificates may be issued by the manufacturer to those who purchase the device and as long as the conditions as to candlepower and adjustment of the headlight are maintained the same as that stated in the certificate of inspection, the owner will be free from molestation by the police. The object of the headlight board on a whole, is to take away from the patrolmen the determination of whether or not a certain light is glaring.

The devices approved include:

1—Monarch Dimmer, made by the Distributors and Manufacturers Co., Chicago. This consists of a frosted, celluloid disk to be set against the ordinary glass lens from either the inside or the outside.

2—The Daylight Dimmer, made by the Dimmer Co. of America, Chicago. This consists of a celluloid shutter opened and closed by an attachment on the lamps. It is to be used in the city only with the shutters closed.

3—The Ellis Deflector, made by the Ellis Time Stamp Co., Chicago. This is made of metal and so arranged that it can be applied to any lamp now in use. It is composed of a spun brass ring with a convex or flat flange to fit and be fastened to the door of the lens, a series of thin tilting shutters, through which the rays of light pass and is so arranged that when the shutters are tilted on an angle of about 10 degrees, the light be thrown on the ground in front of the car and prevent a glare from the reflector. The deflector is made in six sizes and sells at from \$6 to \$12. A guarantee certificate being given with each pair.

4—Safety First, non-glare, made by Charles G. Mollan. This is a parabolic mirror reflector of white enamel with a painted metal cap put in front of the electric bulb.

5—The Nodaz, made by the Ward-Leonard. It consists of two pairs of translucent wings mounted on pivots fastened to the headlight reflector. These leaves are made to open and close by electric magnet inside of the cover of the lens itself. When riding in the city, the wings are closed simply by pressing a push button on the dash. Pushing another button opens the wings and the full light of the lamp is obtained for country riding. This is approved for use in the city, with leaves closed.

6—Challen Antiglare lens made by the Challen Anti-Glare Lens Co., Chicago. This is placed inside the lamp and consists of two annular parts of different diameters placed in front of the center, but so as to diffuse the light rays. It can be used for acetylene or electric lighting. They are made in sizes from 6½ to 12 inches or larger, and they sell at \$6 a pair.

7—The Fowler, made by the Fowler Lamp Co., Chicago, consists of concave opalescent or milk white glass substituted for ordinary clear glass.

8—Ground glass, made by the Vesta Accumulator Co., Chicago. It is to be substituted for the clear glass in the lamp.

9—Auxiliary bulbs of the Vesta Accumulator Co., Chicago. An auxiliary, four candlepower bulb close to the upper part of the reflector, is substituted for the ordinary bulb.

10—Vesta Eclipse. This consists of a ground glass except for a circular alring in the center, which is covered by a removable metal disk attached to the outside of the glass, the disk to be used in the city. These are made by the Vesta Accumulator Co., Chicago, and are sold for \$1.25 each up to 10-inch diameter, and \$1.50 each from 10 to 12 inches diameter.

11—The Ritter lamp, made by J. S. Jackson, Chicago. This consists of moulded glass of alternate, concentric, opaque and clear rings.

12—The Evening Star. The Harman Mfg. Co., Chicago. This is a series of fixed, opaque glass shutters set just inside the glass front of the lamp and inclined slightly upward and backward for acetylene gas.

13—The Nicholas, made by the Wanner Mfg. Co., Chicago.

A number of the dimming devices for electric lamps in which the candlepower will vary by decreasing the voltage or current in the lamp were tried out, but none of them were passed. It was found by the Board that in none of those of that type tested was it possible to remove the glare simply by decreasing the candlepower of the bulb as long as the source of light remained in focus.

The use of frosted bulbs was tried. It was found that when the larger bulb than that for which the reflector was designed was employed so that the light was not quite in focus, that the results were excellent, and it is probable that frosted bulbs will be approved under those conditions, but when what would normally be the proper bulb was used, even though frosted, the source of light being in exact focus, the latter could not be approved. Thus there was less glare with a 24-candlepower bulb frosted, when used in a reflector designed for a 16-candlepower bulb, than was obtained with the 16-candlepower bulb.

Other devices approved include the J-M device made by the Johns-Manville Co. This was formerly known as the Luyties light. The lamp is an electric using 12 candlepower bulbs and having a parabolic mirror reflector. The light is diffused by substituting a convex ground or opalscent glass called the J-M non-blinding lens for the ordinary clear glass for the lamp front. The clear glass area measures 1 inch vertically by 3 inches horizontally and is located close to the lower edge of the lamp front.

### P. G. N. Lamp Approved

J. P. Pagin Lamp Co. submitted the P. G. N. lamp which was approved by the board. This has two lights, one gas and one electric or both electric having separate reflectors one above the other. The part of the glass front in front of the lower light is ground and that one in front of the upper light is of ordinary clear glass. The lamp is designed with a view to using the lower lamp with the ground glass front for city driving and the upper light with a clear glass front for country driving. Attachments are provided for two very small bulbs in front of very small reflectors which are intended to answer the purpose of side lights.

American Double Lens Glass Co. offered a lamp which was approved. This diffuses the rays from the electric light by using for the lamp front a glass having a surface beaded except for an area at the center about 2 inches in diameter which is corrugated radially. This corrugated area at the center is frosted. This was approved for 9 candlepower bulbs with 8 1-2-inch fronts and 10-inch diameter lens with 6 candlepower and 12 candlepower bulbs.

### Boston Dealers Association Elects

BOSTON, MASS., June 15—The annual meeting of the Boston Automobile Dealers' Association was held last week at the headquarters at 5 Park Square. The question of space for the next show was discussed briefly, and Secretary Chester I. Campbell was instructed to prepare blanks and receive applications for the 1915 show which will be held in Mechanics' building on the same dates in March as this year. The election of officers resulted in the following being chosen: John H. MacAlman (Stearns-Knight), president; Josiah S. Hathaway (White), vice-president; F. A. Hinchcliffe (Winton), treasurer; Chester I. Campbell, secretary; board of directors,



J. W. Maguire (Pierce-Arrow), J. W. Bowman (Stevens-Duryea-S. G. V.), E. A. Gilmore (Chalmers-Saxon), Frank E. Wing (Marmon), C. P. Rockwell (Jeffery), Charles E. Fay (Ford).

### Automobile Carnival Plan for Tri-Centennial

NEW YORK CITY, June 17—Governor Glynn has signed the bill appropriating \$100,000 for the celebration of the 300th anniversary of the beginning of the chartered commerce of New York. A main feature of the tercentenary pageant plans, which will start around the latter part of September, is the automobile carnival which will consist of gymkhana events, a series of parades and possibly a hill climb up the Fort George Hill. Alfred Reeves, S. A. Miles, Wm. Poertner, F. J. Wagner, E. G. Batchelder, C. A. Stewart, E. Lascaris, W. M. Sweet, George Duck, David Beecroft, Julian Chase, Harvey Robinson, F. G. Webb, C. N. Bishop, E. F. Korbel and F. M. Colwell have been chosen to serve on the automobile committee.

LANSING, MICH., June 12—The Lansing Chamber of Commerce, in the name of the Manufacturers and Jobbers Association, has protested against the present rates on automobile wheels, hubs and brake drums, by sending a report on the matter to the Interstate Commerce Commission.

### Electric Sociability Run in Washington

WASHINGTON, D. C., June 12—Under the auspices of the Washington Section of the Electric Vehicle Association of America was held on May 27 the first electric automobile sociability run. Fifty-four electric cars were entered. The



Washington electric sociability run

run started in front of the main entrance to the Smithsonian Institution and the 14-mile course was laid out through the Speedway and Rock Creek Park, the finish being made at the Joaquin Miller Cabin, where a basket luncheon was served. The run was a sealed time affair, each contestant endeavoring to cover the 14 miles, observing all traffic and speed regulations, with a secret time.

### Detroit Electric Tours at 19 M. P. H.

PHILADELPHIA, PA., June 12—To show the capabilities of the modern high-powered electric car for general cross-country work, R. L. Heberling of the Philadelphia Storage Battery Co. and J. D. Maxwell, Jr., of the Detroit Electric Car Co., made a run from this city to Washington and return. The full running time to Washington was 8 hours and 53 minutes over a distance of 167 miles, maintaining an average speed of 19 miles per hour. The return trip was made in 9 hours and 23 minutes. The following gives the full data on the trip:

PLACE	LEAVE	PLACE	ARRIVE	MILES	A.H.	TIME	M.P.H.	A.H. BOOST
Philadelphia	4:13	Wilmington	5:48	32	75	1:35	20.6	75
Wilmington	7:54	Belair	11:42	64	167	3:46	17	58
Belair	2:28	Baltimore	4:10	25	71	1:42	15	120
Baltimore	6:42	Washington	9:12	46	105	2:30	18	..
Washington	11:00	Baltimore	12:58	42	105	1:58	21	102
Baltimore	3:52	Belair	6:15	32	86	2:23	15	71
Belair	9:15	Wilmington	1:20	74	190	3:45	20	100
Wilmington	4:10	Philadelphia	5:37	32	79	1:27	22	..

## Detroit's Traffic Rules Are Already Being Copied

### Kalamazoo Adopts Provisions— To Arrest Jay Pedestrians— Parking Regulations Strict

DETROIT, MICH., June 14—Detroit's new traffic regulations are still in their infancy, hardly more than a week old, yet other towns are taking up the cue. Kalamazoo, Mich., has adopted the pedestrian-safety slogan and, it is reported, its policemen are more severe than those of Detroit. Pedestrians failing to observe the new crossing rules who attempt to go from one side of the street to another in a diagonal course are to be arrested, after the regulation has been in force about a fortnight. At the present time policemen have the right to compel disregarders of the new rules to return to their starting point when crossing beyond the fixed lines.

Of the 17,000 cars which are now owned and operated in Detroit, it is estimated at least 2,500—some claim over 3,000—are parked daily between 11 and 5 o'clock within a radius of less than one-half mile from the city hall, the business center of the city.

How many motor cars pass a given point on Woodward avenue, between Campus Martius and John R. street, is estimated all the way from 800 to 1,800 in 1 hour. At the police department it was said that automobiles represent between 9 a. m. and 6 p. m. about 85 per cent. of all vehicles passing, excepting street cars.

Although 190 cars were actually parked on Woodward avenue within four city blocks, between Campus Martius and Grand Park, on June 13 between 4 and 5 o'clock, at least 15 more cars would have been parkable if all had been parked exactly within the marked-off spaces. As it was, a large number were driven in, in any old way, encroaching upon the next space and thus making the systematic parking impossible.

"This will have to be changed," said the traffic sergeant. "We are going to instruct our men to see to it that motorists get their cars within the 8 feet marked off for their cars, and we will compel them to drive out and re-enter their space so that it will be possible to occupy just the number of spaces provided. We do not desire to annoy the motorists, but we do insist upon having them comply and do as they should do. It is our aim to have the whole country look towards Detroit as the city which has the best traffic regulating system, not only on paper, but actually in force.

"We will also try and find some other place than the curbs in the business district for motor cars to be parked all day. Cadillac square, for instance, can be used for that purpose to a great extent.

"We will take cars that are not parked the right way—also those standing all day—and tow them to the police station, where their owners will find them, together with a warning not to be found at fault a second time."

Small posts bearing the following inscription are placed during the hours when traffic is most intense, at the principal crossings, on both sides of the car tracks:

"Vehicles must not stop on crosswalks. Drivers will be prosecuted. By order of the Police Dept."

Here is another sign that is to be found at many places:

"Danger. Cross with the cars. By order of the Police Dept."

Along the curbs or sidewalks in several streets, in front of theaters and big stores, there are posts bearing the following advice:

"Automobiles must not park in this space," and, "Do not park automobiles in this space."

### Saxon Reaches Omaha—28.5 Miles Per Gallon

NEW YORK CITY, June 17—Special Telegram—The Saxon car, which left this city on June 4 for San Francisco, has reached Omaha, Neb., on schedule time after a run of 171 miles from Boone, Ia. The car averaged a little better than 20 miles per hour for the trip. To date the gasoline consumption of the car is 28.5 miles per gallon.

## Twenty-Seven Entries for Sioux City 300-Mile Race

SIoux CITY, IA., June 13—The entry list for the 300-mile race for the \$25,000 purse, to be run off on the local 2-mile dirt track on the Fourth of July, has closed with twenty-seven nominations, the limit that will be permitted to start. The entry list compares most favorably with Indianapolis, although of course lacking the foreign drivers. However, there are several of the foreign cars nominated, including the Delage, which won the 500-mile race and which will be driven here by Billy Knipper. The Peugeot driven at Indianapolis by Goux will be in the Sioux City event with Bob Burman at the wheel. L. C. Erbes of Minneapolis bought the Peugeot this week and will back Burman for the rest of the season. The entry list is as follows:

CAR	DRIVER	ENTRANT
Beaver Bullet	Keene	C. F. Keene
King	Kline	King Motor Car Co.
Marmon	Patschke	Charles Erbstein
White	Shrunk	Bennett Auto Co.
Chalmers	Wetmore	Wetmore Auto Co.
National	Jauer	Roy Bauer
Ray	Brock	S. Brock
Stafford	Callahan	J. Callahan
Stringer Special	Stringer	Mel Stringer
Chevrolet	Le Cain	J. Le Cain
Duesenberg	Haupt	F. Duesenberg
Duesenberg	Richenbacher	F. Duesenberg
Sunbeam	Babcock	Harry Grant
Stutz	Anderson	Stutz Motor Car Co.
Stutz	Oldfield	Stutz Motor Car Co.
Metropol	Horan	Metropol Motor Co.
Moon	Cailloutte	Bennett Auto Co.
Mercer	Wishart	Mercer Motor Co.
Mason	Not named	F. Duesenberg
Braender Bulldog	Chandler	Wyckoff-Cord Auto Co.
Peugeot	Not named	G. Stann
Gray Fox	Wilcox	Frank Fox
Peugeot	Burman	Bob Burman
Chevrolet	Not named	Chevrolet Motor Co.
Delage	Knipper	Billy Knipper

### First Cyclecar Contests Held in New Jersey

HACKENSACK, N. J., June 13—The Cyclecar Club of New Jersey held the first official cyclecar run in the United States from Newark to Teaneck, this afternoon, twelve cars participating.

In the 1,000-yard hill climb, 7 to 1 grade, William Bouldin of East Orange, was first with a Scripps-Booth car, in 26 seconds; James Pearson of New York, in an Owego car, was second, in 31 seconds; and H. C. Fairchild of Newark, in a Scripps-Booth, third, in 34 seconds.

William Seward of Rutherford, in a Twombly, won the hill-climb for light cars in 27 seconds. Seward also won the reverse gear contest for light cars.

William Bouldin won the cyclecar reverse gear contest; Fairchild was second and Pearson third.

P. J. Scull of Newark, won the slow event in a Scripps-Booth.

### Tail Lights for All Vehicles in Cleveland

CLEVELAND, O., June 13—A revision of Cleveland's traffic ordinances provides that every vehicle, motor or horse-drawn, must be equipped with tail lights. The clause is a drastic departure in the new "Safety First" ordinance, operative on everything but a baby carriage. Every vehicle carrying material which projects beyond the dimensions of the vehicle must have a light hanging on the end of the cargo. This clause was inserted at the request of a councilman who was hit in the face by a piece of pipe extending from the rear of a plumber's truck.

### Eight-Cylinder Car Stars at Seattle

SEATTLE, WASH., June 15—Sensational driving and two bad accidents marked the 2-day meet on the mile track at Portland, Ore., Saturday and Sunday. Percy Barnes, of Seattle, driving an eight-cylinder Romano Special, was star of the meet and proved that his car will be a dangerous contender in the Northwest and the Coast races this season. In the elimination trials Saturday he led the field, circling the course in :55 2-5; Parsons in a Frantz special, was second; G. N. Smith, in a Chalmers, third; and Joe Thomas, in a Locomobile, fourth.

The Romano Special won the 25-mile race in 25 minutes and 40 seconds; Frantz was second, and the Chalmers and Locomobile did not finish. The 20-mile race, which was won by Welch in a Mercer, resulted in probably fatal injuries to

A. J. Edwards, driver of the Palmer-Singer car. His mechanic, James Foley, was badly injured. Welch won the race in slow time, Schneider in a Hudson, was second, and the Lozier, third.

Sunday's races were exciting but were marred by the killing of 17-year-old Walter McKay, in the closing minutes of the program. H. P. Deebach's car skidded into the fence striking the boy. Barnes in the Romano won the 40-mile race by four laps, his time being 41:50 3-5; Frantz special, driven by Parsons, was second; Mercer, driven by Welch, was third.

The 15-mile race also went to the Romano special in 14:35 1-5; Frantz special was second; Mercer, third.

BOSTON, MASS., June 15—The two days' run of the New England Cyclecar Assn. from Boston to Springfield and back was so successful that a second one is to take place next Saturday. This will be a one-day affair and the cars will go through Cambridge, Arlington, Winchester, Woburn, Lowell, Lawrence and Haverhill, a distance of about 40 miles, where a lunch will be served. Then the cars will go to Amesbury and Beverly to Boston.

### Nazzaro on Nazzaro Wins Florio Cup

CERDA, June 2—One week after Ceirano had won the Targa Florio race around the island of Sicily, defeating a field of thirty-one, among whom Nazzaro, the Florio Cup race was staged on the Madonia course, which is 150 kilometers around, very rough and tortuous and had to be covered three times, making a total distance of 450 kilometers. Here Nazzaro in a short, compact and light 71-horsepower car of his own manufacture, won at an average speed of 34.12 miles per hour over the more powerful Scat piloted by Ceirano although the latter proved itself 9 minutes faster in running-time. Nazzaro lost only 50 seconds taking fuel aboard, while Ceirano made two changes of tires and wheels. The score was as follows:

	H.M.S.
Nazzaro (Nazzaro, Pirelli tires)	8:11:22
Ceirano (SCAT, Dunlop tires)	8:15:57
Franchini (Alfa)	8:25:19
Campari (Alfa)	8:31:14
Colombo (SCAT)	8:40:43
Sivocci (De Vecchi)	8:51:22
Lopez (Fiat)	8:57:30
Negro (Caesar)	9:05:44
Cortese (Nazzaro)	9:20:00

### Usual Beach Meet at Galveston

NEW YORK CITY, June 15—Again Galveston, Texas, is to stage the only automobile beach meet to be held this season. The professional events will be run on July 30, August 1 and August 3, and the events for amateurs will be held on July 31. The Galveston beach races are run each year simultaneous with the big annual Cotton Carnival which draws people from the entire state of Texas and the surrounding country. Each year thousands attend the races and the grandstands are packed to capacity with enthusiastic crowds. This year will mark the sixth running of the event and it is expected that it will outshine all previous attempts from every viewpoint. The committee has appropriated \$5,000 in prizes for the different events to be run.

### Orders as Prizes in Russian Run

NEW YORK CITY, June 15—An endurance contest will be held in Russia the latter part of August. It will be a run of 2,500 miles, known as the Coupe de l'Empereur. The contest is conducted by the Grand Army of the Empire and the Russian Automobile Club, for the purpose of ascertaining the automobile which will be the most durable under Russian road conditions. The prize winner will receive an order for 250 cars; second prize, 150 cars; third prize, 100 cars; and the fourth prize, fifty cars.

### To Take Care of Matheson Repairs

WILKES-BARRE, PA., June 13—Frank F. Matheson has undertaken to provide for the requirements of Matheson owners by maintaining the stock of repair parts and supplies at the Matheson plant at Wilkes-Barre, Pa. At the time of the recent sale of the assets of the Matheson Automobile Co., the repair parts, which at that time were inventoried as of value of approximately \$115,000, were taken over in one lot by Mr. Matheson.



# Factory Miscellany

**FORD Assessment Over \$30,000,000**—Although the exact figures have not been made public, it is announced that the total assessments of Highland Park, the Detroit suburb where the Ford Motor Co. is located, will amount to a little over \$30,000,000, and out of this sum the assessment of the Ford company amounts to over \$16,000,000. Including other businesses connected with the automobile industry and located in Highland Park, the assessments against these industries amount to two-thirds of the total assessments against all taxable properties. This year shows an increase over last year of about \$8,000,000, and out of this difference about 50 per cent. is credited to the Ford plants.

**Victor Auto Parts Plant**—The proposed plant of the Victor Auto Parts Co., Cincinnati, O., will be 60 by 158 feet, four stories, of reinforced concrete construction. Work will be commenced at once.

**Standard Truck to Enlarge**—The Standard Motor Co., Warren, O., manufacturer of the Standard motor truck, has found present factory quarters insufficient and plans have been drawn and work will start soon on an addition which will cost \$15,000.

**Schaefer Co. Builds**—The Schaefer Wagon Co., of Lorain avenue, Cleveland, O., has started the erection of a large plant which will be fireproof throughout. One of the departments will be devoted to painting and repairing automobiles and motor trucks.

**Ford to Double Pittsburgh Plant**—Announcement is made by the Pittsburgh Industrial Development Commission that in the fall the big assembling plant of

the Ford Motor Co. at Morewood and Atherton avenues, now in course of erection, will be doubled in size.

**Huffman Plant Sold**—All of the real estate and many of the chattels of the Huffman Traction Engine Co., Kenton, O., were sold at bankruptcy sale recently to the Ohio Steel Foundry Co., Lima. Other personal property was sold to various bidders. It is doubtful if the plant will be operated as a factory for tractors.

**Quality Tire Ready for Work**—The Quality Tire & Rubber Co., of Hartville, O., expect to begin operations the latter part of June or the first of July. The newly incorporated company is capitalized at \$75,000 and will employ thirty-five men at first. The building, which is nearly ready for occupancy, has 7,600 square feet.

**U. S. Truck Plant Bought**—The plant of the United States Motor Truck Co., Cincinnati, O., has been purchased by a company headed by R. C. Stewart, president Stewart Iron Works Co., Covington, Ky. The factory equipment will be moved to a new building recently completed by the Stewart company, adjoining its iron fence works. Only a limited amount of new equipment will be required.

**St. Louis Ford Uses Tent**—The Ford Motor Co.'s St. Louis branch has outgrown its building and recently a three-pole circus tent was erected to cover the yard, 150 by 100 feet, to provide additional space. The new building is a five-story affair, basement and roof area available for testing purposes, an area 150 by 162 feet. The tent also will provide a parking space for assembled cars. Starting next week, the plant will begin to assemble forty-five cars daily, fifteen

more daily than the present output.

**Ford's Cleveland Plant Opened**—The new assembling plant of the Ford Motor Co., located at Buckingham and Cleveland avenues, Columbus, O., was opened recently. The branch, which has been located on North Fourth street, has been abandoned and all of the office force moved to the new building. P. F. Minnock will have charge of the branch and assembling plant. The building, which is 100 by 200 feet, is absolutely of fireproof construction. It is four stories in height with a basement and the construction was along the most modern lines. All parts will be shipped to Columbus, assembled and tested. A testing track has been constructed on the roof.

**Proposed Chautauqua Cyclecar Plant**—H. J. Newman, Jamestown, N. Y., is contemplating using the Penn Motor Co., New Castle, Ind., for the manufacture of the Chautauqua cyclecar. The Chautauqua cyclecar weighs 700 pounds, is 56 inches in width and has a 102-inch wheelbase. It is proposed to sell for \$400. Mr. Newman is particularly desirous of locating his plant in New Castle for the reason that the frame and axles are manufactured in Sharon and the tubing in Ellwood City. Owing to the short haul this would be a strategic point for the business, as considerable overhead expense would be eliminated on account of the low freight.

According to Mr. Newman, it would require about \$50,000 working capital to get the business started on a basis of 1,000 cars the first year.

**Holtzer-Cabot's New Plant**—The Holtzer-Cabot Electric Co., Brookline, Mass., has started work on the large factory which will be located on Amory street, Roxbury, near Boylston Station.

## The Automobile Calendar

June 18.....Uniontown, Pa., Hill Climb, Auto Club of Fayette Co.	July 25-26.....Belgium Grand Prix Road Races.	Sept. 10-15.....Berlin, Germany, German 4½-liter race.
June 20.....Milwaukee, Wis., Competition Run between Milwaukee Athletic Club and Milwaukee Automobile Club.	Aug. 2-9.....Grenoble, Automobile Club of France's 6-Day Motorcycle and Cyclecar Reliability Contest in French Alps.	Sept. 26.....Brooklands Track, England, Annual Automobile Race.
June 23-26.....S. A. E. Summer Meeting, Cape May, N. J., Cape May Hotel.	August 16.....Le Mans, France, Automobile Club de la Sarthe's Coupé International Light-Car Race, 1 liter, 400 maximum cylinder area, 350-500 kilos weight.	Sept. 26-Oct. 6.....Berlin, Germany, Automobile Show.
June 24.....Syracuse, N. Y., Annual Club Run, Automobile Club of Syracuse.	Aug. 17.....Le Mans, France, Auto Club de la Sarthe's Grand Prize de France for 4½ liter cars.	Oct. ....Philadelphia, Pa., E. V. A. A. Annual Convention.
June 24-26.....Chicago, Ill., Seventh Annual Meeting of Nat. Gas Engine Assn.	Aug. 21-22.....Chicago, Ill., Elgin Road Races, Chicago Automobile Club.	Oct. 7-17.....New York City, Electric Vehicle Show, Grand Central Palace.
June 27-July 4.....A. A. A. Touring Week.	Aug. 23.....Auvergne, France, Coupé de l'Auto Race.	Oct. 9-Nov. 2.....S. A. E. European Trip.
June 27.....Brooklands Track, England; Annual Automobile Race.	Aug. 27.....Brooklands Track, England; Annual Automobile Race.	Oct. 16-26.....Paris, France, Automobile Salon.
June 30.....London, Eng., Fourth International Rubber and Allied Industries Congress.	Aug. ....Russia, Road Race, Coupe de l'Empereur, 2,500 miles.	Oct. 17-24.....Pittsburgh, Pa., Automobile Show, Auto Dealers Assn., Inc.
July 3-4.....Tacoma, Wash., Montamara Feste Races, Tacoma Speedway Assn.	Sept. 2-7.....Brescia, Italy, Auto Club of Italy's 4½-liter Grand Prize.	Oct. 19, 20, 21.....Philadelphia, Pa., Elec. Veh. Assn's Convention.
July 4.....Prescott, Ariz., Road Race, Prescott Auto Club.	Sept. 7-14.....Indianapolis, Ind., Automobile Show, Indianapolis Automobile Trade Assn.	Oct. 19-26.....Atlanta, Ga., American Road Congress of the American Highway Assn. and the A. A. A.
July 4.....Sioux City, Iowa, 300-Mile Race, Sioux City Auto Club and Speedway Assn.	Sept. 9.....Corona, Cal., Road Race, Corona Auto Assn.	Oct. 28-31.....Milwaukee, Wis., Convention, Northwestern Road Congress, Auditorium.
July 4.....Lyons, France, French Grand Prix.		November .....El Paso, Tex., Phoenix Road Race, El Paso Auto Club.
July 13-14.....Seattle, Wash., Track Races, Seattle Speedway Assn.		Nov. 6-14.....London, England; Olympia Show.
		November 8-11.....Shreveport, La., Track Meet, Shreveport, Auto Club.
		November 15.....Paris, France, Kerosene Motor Competition.

# Accessories for the Automobilst

**A**ERO Power Tire Pump—The Advance Machinery Company, Toledo, O., has just placed on the market the new Aero pump, a motor-driven pump, Figs. 1 and 2, in one, two and three cylinder models, designed both for regular and special equipment on new cars or for installation on motor cars already in service. This new pump conforms to the standard magneto dimensions adopted by the Society of Automobile Engineers. This means quick and easy installation on practically any car.

The cylinder and crank-case parts of the Aero pump are gray iron castings, sand blasted, double coated with black baked enamel. The trimmings are nickel. The crankshaft and the connecting rods are drop forged. The connecting-rod crank bearings and the crankshaft main bearings are die cast. The pistons are of gray iron. The bore of the cylinder is  $1\frac{1}{2}$  inches, with a stroke of  $1\frac{1}{2}$  inches.

The intake valves are carefully screened to keep the air pure, and they are located in the side of the cylinder head to eliminate the possible leakage of oil. The splash system is used for the lubrication of the cylinders and the bearings of the crankshaft and the gearshift devices. It is practically impossible for oil to work up on the cylinder head, but in order to prevent absolutely any oil going into the tires two different forms of oil separators have been provided for use between the outlet valve and the tire connection.

A feature of value is the automatic blow-off valve. This can be set for any pressure desired in the tires, and it automatically exhausts when this pressure is reached.

Two styles of gearshift are provided for bringing the pump mechanism and the engine of the car into engagement, a patent eccentric gearshift and a shift that slides into engagement on the crank shaft. The sliding action brings only the edges of the teeth into engagement at the first contact, while the eccentric action brings the whole width of the face of the gears into engagement at once and makes it possible to start the pump on practically any speed at which the motor may be running. With either form of gearshift, a simple throw of the lever delivers the power of the motor to the pump.

One revolution of the crank shaft gives a displacement of 2.39 cubic inches of free air for the one-cylinder pump; 4.78 cubic inches for two cylinders, and 7.17 cubic inches for three cylinders.

The cylinders, cylinder heads and base have all been designed so that they can be turned end for end and thus change the assembly of the pump from right to left in relation to the driving end. This

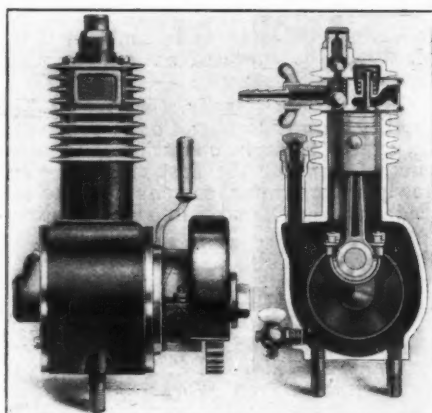


Fig. 1—Side elevation of one-cylinder Aero pump and section through pump cylinder

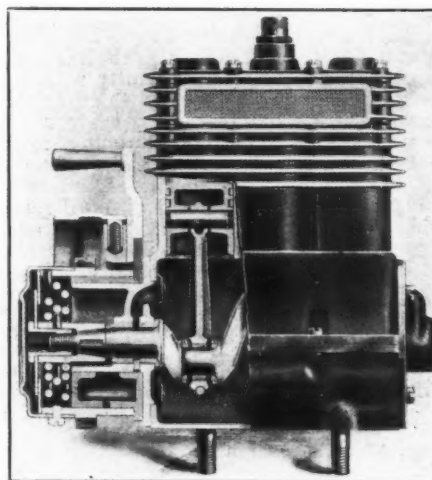


Fig. 2—Three-cylinder Aero pump

makes the pump absolutely universal as to the various assembly conditions that may be encountered on the different motor cars.

The particular advantages claimed for the Aero pump are that it guarantees pure air and no oil in the tires; that it guarantees perfect inflation by means of the automatic blow-off valve; that it is trouble proof and always ready for service; that it is effective and reliable in operation; that it saves time, labor and expense, and, above all, that it is easily installed on any car.

Each pump is regularly equipped with the sliding gearshift, the automatic blow-off valve, an air-pressure gauge and 13 feet of rubber hose. The prices are as follows: One cylinder, \$15; two cylinder, \$20; three cylinder, \$25. The eccentric gearshift is substituted at ad-

ditional cost of \$3. Other equipment when desired: Oil separator, \$1.50; supporting bracket, \$1; split gear for motor shaft, \$2.50.

**Service Cyclecar Motor**—Realizing that water-cooled motors have certain advantages for cyclecar work not possessed by air-cooled motors, and vice versa, the Rochester Motors Co., Rochester, N. Y., has put on the market a V-type motor, Fig. 3, that is furnished with either air or water-cooled cylinders as desired.

The motor is a conventional design with valves in the head. The horsepower rating is 12 and the bore and stroke 3.375 by 4 inches. This gives a piston displacement of 71.5 inches, which brings it just over the cyclecar definition.

The cylinders are constructed of special close-grained cast iron, rough bored, heat treated and ground to size. The cylinder heads are removable, permitting easy access to the valves and pistons. They are held in place by studs. The valves are of large diameter in proportion to the motor's displacement and are made of 3.5 per cent. Rich tungsten steel. All motor parts are made from special alloy steel, heat treated.

Heavy-duty ball bearings are employed for carrying the crankshaft, while the connecting rods have a special type of roller bearing.

Lubrication is furnished by a positive displacement pump, which furnishes clean, fresh oil in just the right amount for the speed at which the engine is running.

When air cooling is used the air circulation can be supplied either by means of a propeller-shaped fan or with inclosed case and flywheel exhaust fan, which provides still more uniform cooling, it is stated.

The weight of either air or water-cooled type, including Schebler carbureter and Unisparker, is but 85 pounds.

**Bradley Safety Auto Lock**—A gasoline locking device which has a long barrel on it so that the upper end, into which the key is inserted, extends through the floor boards and within convenient reach of the driver, is manufactured by the Bradley Safety Auto Lock Co., 1428 Lawrence street, Denver, Col. No two keys are alike.

It is stated that by intelligent use of this lock there is no possibility of a car being stolen. For instance, if the car is left at the curb, the motor should not

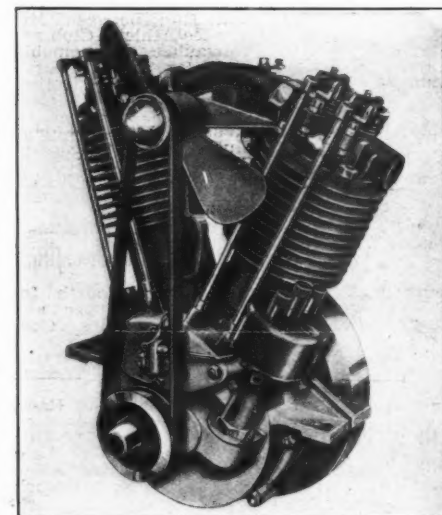


Fig. 3—Service cyclecar motor





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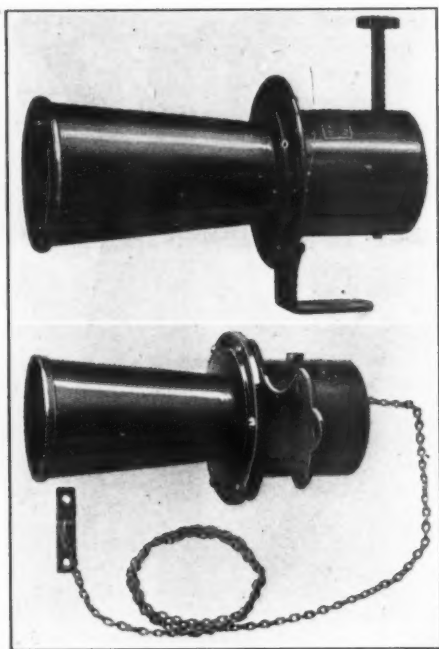


Fig. 4—Upper—Handphone mechanical horn. Lower—Cablephone horn. The chain is attached to the steering wheel rim

be stopped by switching off the spark but the gasoline should be shut off by means of the lock. In this way the carburetor float chamber will be emptied and there will be no danger of a thief driving the car far enough away to tinker with the lock, as would be possible if the chamber were left full. In order not to waste gasoline it is best to find out how far the car will run after the line is locked and then after that when a stop is to be made shut the gasoline off far enough away from the stopping place to allow the gasoline to be used up.

On the other hand, when the car is left in the garage the chamber should be left full, so that in case of fire anyone can start the car and run it out without delay under its own power; but at the same time there is no danger of any joy-riding being done.

**Handphone and Cablephone Horns—**Two new horns, Fig. 4, have been put on the market by the Automobile Supply Mfg. Co., Brooklyn, N. Y. One is operated by depressing a hand button extending from the top of the horn housing, and the other is blown by pulling a chain that is attached to the rim of the steering wheel. The former must be within easy reach of the driver, and is generally located at the side of the car. The latter, however, like an electrically operated horn, can be placed anywhere, the chain being of sufficient length to allow this. The price of both devices is \$7.

**Cox Radius Rod Support—**For the purpose of providing greater rigidity to the front axle construction of the Ford, the Cox Brass Mfg. Co. has brought out a reinforcement, Fig. 5, in the form of an extra set of radius rods that clamp on to the bottom flange of the axle and also to the main radius rods back near the ball joint. It is stated that with this addition there is no tendency for the axle to tilt backwards.

It is easily attached by anyone. There are no holes to drill; it is simply clamped in position. It can be put on in 5 minutes. A feature is that the rods are adjustable by means of screwing up on

the nuts that hold the rods to the axle clamps.

**The Transimeter Hub Odometer—**The American Taximeter Co., 735 Seventh avenue, New York City, has recently acquired the manufacturing rights of the Transimeter, Fig. 6, which is a hub odometer with the feature that its face does not rotate with the wheel but remains in the same position at all times, it being held in place by a pin that is inserted in the axle. The obvious advantage is that it is most convenient to read.

This device, which has been manufactured by the Transimeters Co., New York City, for 8 years, is made in three styles, known as the Dreadnought, type A and type XX. The Dreadnought, as its name suggests, is for heavy trucks where the service is severe. The instrument is furnished complete with a hub

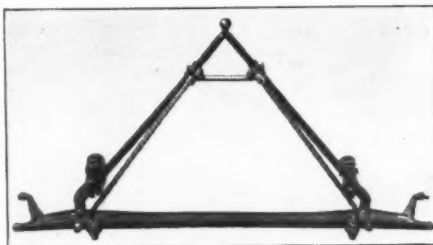


Fig. 5—Cox radius rod support

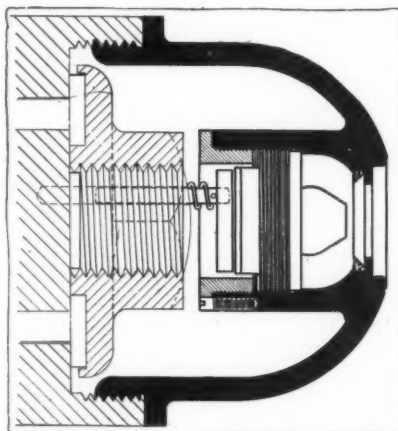


Fig. 6—Transimeter hub odometer

for \$25. The casing is especially heavy, while a thick central housing carries the counting mechanism under the two-fold shelter of a wide air space and sloping external walls .25 inch in thickness. Through this combination, it is

stated, no blow can possibly reach the counting mechanism.

Type A, which sells for \$18, is recommended for lighter truck work. It is attachable at short notice to the hub cap already on the car. It has a steel casing .375 inch thick and is a damage proof instrument.

For pleasure cars and runabout delivery, type XX, selling for \$16.50, is a graceful modification of the type A. The casing is white vanadium bronze .25 inch thick. It is finished with a high polish.

The Transimeter gives a complete mileage record. Every turn of the wheel, either forward or backward, makes its proper addition to the record. It may be placed on either side of the car and it registers by tenths of a mile to 10,000 miles and then repeats.

The counting mechanism is the product of 8 years of engineering. All rubbing and pivoted parts are combinations of hardened steel and special bronze lubricated with chronometer oil.

No gear in the counter turns more than once per mile and the parts have little weight, so there is little possibility of the instrument wearing out.

The instrument is held vertical by a hardened pin fitting in a hole in the axle and is pressed outward by a spring.

**Eastman Spring Suspension—**A decidedly new and interesting form of spring suspension is about to be put upon the market by the Eastman Spring Co., Charlestown, Mass., after 4 years of experimenting and development.

The invention, Fig. 7, consists of a sort of a double radius rod, the center of which is attached to the axle. At one end there is a heavy spiral spring which is fastened to the frame and at the other there is a friction shock absorber of the disk type.

The axle is kept in alignment and the drive is taken through the rod R. When the car passes over a bump the axle is forced nearer to the frame and this causes the unwinding of the spiral spring to a slight extent. At the same time shocks are absorbed by the friction device operated through the bell crank and ball joint at B.

The inner end of the spiral spring is held on a bushing provided with a roller bearing. The arm to which the spiral is attached is provided with an adjustment to adapt it to the weight of the car. Due to the fact that there is a pull on the rod R, rather than a thrust, the tendency is for the frame to be depressed instead of raised.

In changing over from the usual leaf spring system only a day is consumed, as the new spring suspension is designed to replace the old without special fitting.

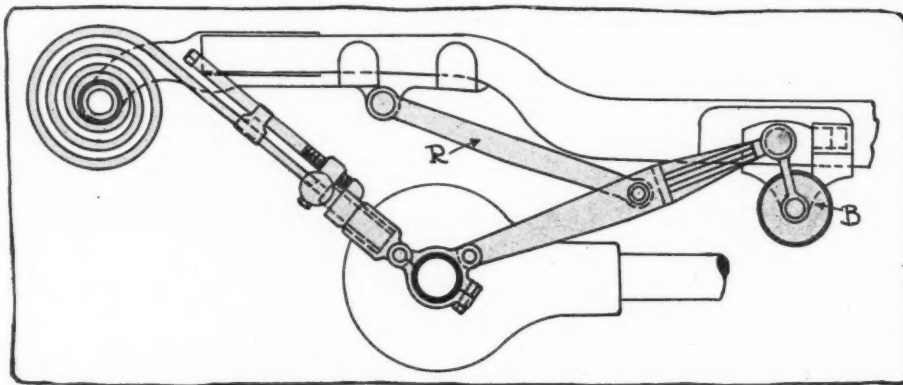


Fig. 7—Eastman spring suspension. It embodies a spiral spring and a shock absorber